Miller®
The Power of Blue.

OM-358 **188 291K**

September 2000

Processes

TIG (GTAW) Welding

Stick (SMAW) Welding

Description

1 Phase 3 Phase AC/DC CC

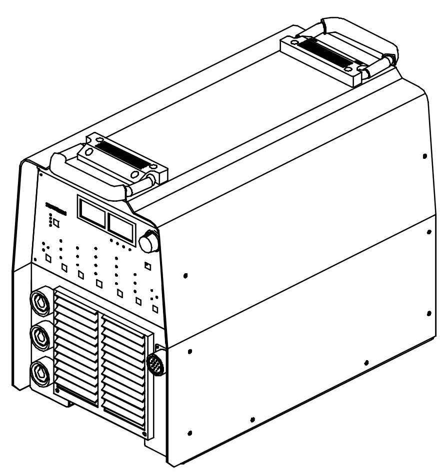
230/460 Volt Models W/Autolink®

3 Phase AC/DC CC

400 Volt Models

Arc Welding Power Source

Dynasty™ 300 SD, DX And LX



CE And Non-CE Models

OWNER'S MANUAL

Visit our website at

www.MillerWelds.com

From Miller to You

Thank you and *congratulations* on choosing Miller. Now you can get the job done and get it done right. We know you don't have time to do it any other way.



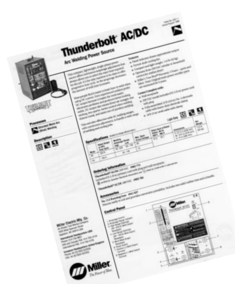
That's why when Niels Miller first started building arc welders in 1929, he made sure his products offered long-lasting value and superior quality. Like you, his customers couldn't afford anything less. Miller products had to be more than the best they could be. They had to be the best you could buy.

Today, the people that build and sell Miller products continue the tradition. They're just as committed to providing equipment and service that meets the high standards of quality and value established in 1929.

This Owner's Manual is designed to help you get the most out of your Miller products. Please take time to read the Safety precautions. They will help you protect yourself against potential hazards on the worksite. We've made installation and operation quick and easy. With Miller you can count on years of reliable service with proper maintenance. And if for some reason the unit needs repair, there's a Troubleshooting section that will help you figure out what the problem is. The parts list will then help you to decide which exact part you may need to fix the problem. Warranty and service information for your particular model are also provided.

Miller is the first welding equipment manufacturer in the U.S.A. to be registered to the ISO 9001 Quality System Standard.

Working as hard as you do – every power source from Miller is backed by the most hassle-free warranty in the business.



Miller offers a Technical Manual which provides more detailed service and parts information for your unit. To obtain a Technical Manual, contact your local distributor. Your distributor can also supply you with Welding Process Manuals such as SMAW, GTAW, GMAW, and GMAW-P.

Miller Electric manufactures a full line of welders and welding related equipment. For information on other quality Miller products, contact your local Miller distributor to receive the latest full line catalog or individual catalog sheets. **To locate your nearest distributor or service agency call 1-800-4-A-Miller, or visit us at www.MillerWelds.com on the web.**



The Power of Blue.

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⚠ WARNING

This product, when used for welding or cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code Section 25249.5 et seq.)

The following terms are used interchangeably throughout this manual:
TIG = GTAW
Stick = SMAW

(Continued)

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Declaration of Conformity For European Community (CE) Products

NOTE ☞	*This information is provided for units with CE certification (see rating label on unit.)*

Manufacturer's Name: Miller Electric Mfg. Co.

Manufacturer's Address: 1635 W. Spencer Street
Appleton, WI 54914 USA

Declares that the product: **Dynasty™ 300 SD, DX, LX**

conforms to the following Directives and Standards:

Directives

Low Voltage Directive: 73/23/EEC

Machinery Directives: 89/392/EEC, 91/368/EEC, 93/C 133/04, 93/68/EEC

Electromagnetic Capability Directives: 89/336, 92/31/EEC

Standards

Safety Requirements for Arc Welding Equipment part 1: EN 60974-1: 1990

Arc Welding Equipment Part 1: Welding Power Sources: IEC 974-1
(December 1996 – Draft revision)

Degrees of Protection provided by Enclosures (IP code): IEC 529: 1989

Insulation coordination for equipment within low-voltage systems:
Part 1: Principles, requirements and tests: IEC 664-1: 1992

Electromagnetic compatibility (EMC) Product standard for arc welding equipment:
EN50199: August 1995

European Contact: Mr. Luigi Vacchini, Managing Director
MILLER Europe S.P.A.
Via Privata Iseo
20098 San Giuliano
Milanese, Italy

Telephone: 39(02)98290-1
Fax: 39(02)98281-552

SECTION 1 – SAFETY PRECAUTIONS - READ BEFORE USING

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1-1. Symbol Usage



Means Warning! Watch Out! There are possible hazards with this procedure! The possible hazards are shown in the adjoining symbols.

▲ **Marks a special safety message.**

☞ *Means "Note"; not safety related.*



This group of symbols means Warning! Watch Out! possible ELECTRIC SHOCK, MOVING PARTS, and HOT PARTS hazards. Consult symbols and related instructions below for necessary actions to avoid the hazards.

1-2. Arc Welding Hazards

▲ **The symbols shown below are used throughout this manual to call attention to and identify possible hazards. When you see the symbol, watch out, and follow the related instructions to avoid the hazard. The safety information given below is only a summary of the more complete safety information found in the Safety Standards listed in Section 1-4. Read and follow all Safety Standards.**

▲ **Only qualified persons should install, operate, maintain, and repair this unit.**

▲ **During operation, keep everybody, especially children, away.**



ELECTRIC SHOCK can kill.

Touching live electrical parts can cause fatal shocks or severe burns. The electrode and work circuit is electrically live whenever the output is on. The input power circuit and machine internal circuits are also live when power is on. In semiautomatic or automatic wire welding, the wire, wire reel, drive roll housing, and all metal parts touching the welding wire are electrically live. Incorrectly installed or improperly grounded equipment is a hazard.

- Do not touch live electrical parts.
- Wear dry, hole-free insulating gloves and body protection.
- Insulate yourself from work and ground using dry insulating mats or covers big enough to prevent any physical contact with the work or ground.
- Do not use AC output in damp areas, if movement is confined, or if there is a danger of falling.
- Use AC output ONLY if required for the welding process.
- If AC output is required, use remote output control if present on unit.
- Disconnect input power or stop engine before installing or servicing this equipment. Lockout/tagout input power according to OSHA 29 CFR 1910.147 (see Safety Standards).
- Properly install and ground this equipment according to its Owner's Manual and national, state, and local codes.
- Always verify the supply ground – check and be sure that input power cord ground wire is properly connected to ground terminal in disconnect box or that cord plug is connected to a properly grounded receptacle outlet.
- When making input connections, attach proper grounding conductor first – double-check connections.
- Frequently inspect input power cord for damage or bare wiring – replace cord immediately if damaged – bare wiring can kill.
- Turn off all equipment when not in use.
- Do not use worn, damaged, undersized, or poorly spliced cables.
- Do not drape cables over your body.
- If earth grounding of the workpiece is required, ground it directly with a separate cable.
- Do not touch electrode if you are in contact with the work, ground, or another electrode from a different machine.
- Use only well-maintained equipment. Repair or replace damaged parts at once. Maintain unit according to manual.
- Wear a safety harness if working above floor level.
- Keep all panels and covers securely in place.
- Clamp work cable with good metal-to-metal contact to workpiece or worktable as near the weld as practical.
- Insulate work clamp when not connected to workpiece to prevent contact with any metal object.
- Do not connect more than one electrode or work cable to any single weld output terminal.

SIGNIFICANT DC VOLTAGE exists after removal of input power on inverters.

- Turn Off inverter, disconnect input power, and discharge input capacitors according to instructions in Maintenance Section before touching any parts.



FUMES AND GASES can be hazardous.

Welding produces fumes and gases. Breathing these fumes and gases can be hazardous to your health.

- Keep your head out of the fumes. Do not breathe the fumes.
- If inside, ventilate the area and/or use exhaust at the arc to remove welding fumes and gases.
- If ventilation is poor, use an approved air-supplied respirator.
- Read the Material Safety Data Sheets (MSDSs) and the manufacturer's instructions for metals, consumables, coatings, cleaners, and degreasers.
- Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Always have a trained watch-person nearby. Welding fumes and gases can displace air and lower the oxygen level causing injury or death. Be sure the breathing air is safe.
- Do not weld in locations near degreasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapors to form highly toxic and irritating gases.
- Do not weld on coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the weld area, the area is well ventilated, and if necessary, while wearing an air-supplied respirator. The coatings and any metals containing these elements can give off toxic fumes if welded.

ARC RAYS can burn eyes and skin.



Arc rays from the welding process produce intense visible and invisible (ultraviolet and infrared) rays that can burn eyes and skin. Sparks fly off from the weld.

- Wear a welding helmet fitted with a proper shade of filter to protect your face and eyes when welding or watching (see ANSI Z49.1 and Z87.1 listed in Safety Standards).
- Wear approved safety glasses with side shields under your helmet.
- Use protective screens or barriers to protect others from flash and glare; warn others not to watch the arc.
- Wear protective clothing made from durable, flame-resistant material (leather and wool) and foot protection.

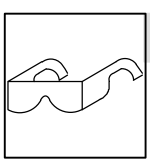
WELDING can cause fire or explosion.



Welding on closed containers, such as tanks, drums, or pipes, can cause them to blow up. Sparks can fly off from the welding arc. The flying sparks, hot workpiece, and hot equipment can cause fires and burns. Accidental contact of electrode to metal objects can cause sparks, explosion, overheating, or fire. Check and be sure the area is safe before doing any welding.

- Protect yourself and others from flying sparks and hot metal.
- Do not weld where flying sparks can strike flammable material.
- Remove all flammables within 35 ft (10.7 m) of the welding arc. If this is not possible, tightly cover them with approved covers.
- Be alert that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas.
- Watch for fire, and keep a fire extinguisher nearby.
- Be aware that welding on a ceiling, floor, bulkhead, or partition can cause fire on the hidden side.
- Do not weld on closed containers such as tanks, drums, or pipes, unless they are properly prepared according to AWS F4.1 (see Safety Standards).
- Connect work cable to the work as close to the welding area as practical to prevent welding current from traveling long, possibly unknown paths and causing electric shock and fire hazards.
- Do not use welder to thaw frozen pipes.
- Remove stick electrode from holder or cut off welding wire at contact tip when not in use.
- Wear oil-free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes, and a cap.
- Remove any combustibles, such as a butane lighter or matches, from your person before doing any welding.

FLYING METAL can injure eyes.



- Welding, chipping, wire brushing, and grinding cause sparks and flying metal. As welds cool, they can throw off slag.
- Wear approved safety glasses with side shields even under your welding helmet.

BUILDUP OF GAS can injure or kill.



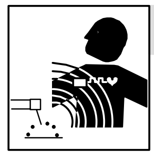
- Shut off shielding gas supply when not in use.
- Always ventilate confined spaces or use approved air-supplied respirator.

HOT PARTS can cause severe burns.



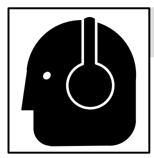
- Do not touch hot parts bare handed.
- Allow cooling period before working on gun or torch.

MAGNETIC FIELDS can affect pacemakers.



- Pacemaker wearers keep away.
- Wearers should consult their doctor before going near arc welding, gouging, or spot welding operations.

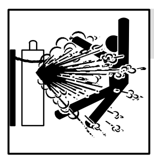
NOISE can damage hearing.



Noise from some processes or equipment can damage hearing.

- Wear approved ear protection if noise level is high.

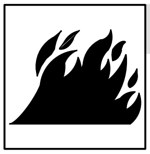
CYLINDERS can explode if damaged.



Shielding gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. Since gas cylinders are normally part of the welding process, be sure to treat them carefully.

- Protect compressed gas cylinders from excessive heat, mechanical shocks, slag, open flames, sparks, and arcs.
- Install cylinders in an upright position by securing to a stationary support or cylinder rack to prevent falling or tipping.
- Keep cylinders away from any welding or other electrical circuits.
- Never drape a welding torch over a gas cylinder.
- Never allow a welding electrode to touch any cylinder.
- Never weld on a pressurized cylinder – explosion will result.
- Use only correct shielding gas cylinders, regulators, hoses, and fittings designed for the specific application; maintain them and associated parts in good condition.
- Turn face away from valve outlet when opening cylinder valve.
- Keep protective cap in place over valve except when cylinder is in use or connected for use.
- Read and follow instructions on compressed gas cylinders, associated equipment, and CGA publication P-1 listed in Safety Standards.

1-3. Additional Symbols For Installation, Operation, And Maintenance



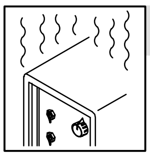
FIRE OR EXPLOSION hazard.

- Do not install or place unit on, over, or near combustible surfaces.
- Do not install unit near flammables.
- Do not overload building wiring – be sure power supply system is properly sized, rated, and protected to handle this unit.



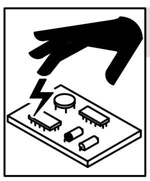
FALLING UNIT can cause injury.

- Use lifting eye to lift unit only, NOT running gear, gas cylinders, or any other accessories.
- Use equipment of adequate capacity to lift and support unit.
- If using lift forks to move unit, be sure forks are long enough to extend beyond opposite side of unit.



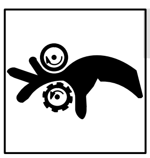
OVERUSE can cause OVERHEATING

- Allow cooling period; follow rated duty cycle.
- Reduce current or reduce duty cycle before starting to weld again.
- Do not block or filter airflow to unit.



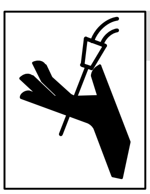
STATIC (ESD) can damage PC boards.

- Put on grounded wrist strap BEFORE handling boards or parts.
- Use proper static-proof bags and boxes to store, move, or ship PC boards.



MOVING PARTS can cause injury.

- Keep away from moving parts.
- Keep away from pinch points such as drive rolls.



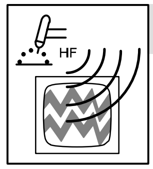
WELDING WIRE can cause injury.

- Do not press gun trigger until instructed to do so.
- Do not point gun toward any part of the body, other people, or any metal when threading welding wire.



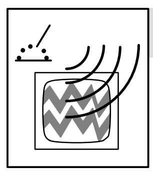
MOVING PARTS can cause injury.

- Keep away from moving parts such as fans.
- Keep all doors, panels, covers, and guards closed and securely in place.



H.F. RADIATION can cause interference.

- High-frequency (H.F.) can interfere with radio navigation, safety services, computers, and communications equipment.
- Have only qualified persons familiar with electronic equipment perform this installation.
- The user is responsible for having a qualified electrician promptly correct any interference problem resulting from the installation.
- If notified by the FCC about interference, stop using the equipment at once.
- Have the installation regularly checked and maintained.
- Keep high-frequency source doors and panels tightly shut, keep spark gaps at correct setting, and use grounding and shielding to minimize the possibility of interference.



ARC WELDING can cause interference.

- Electromagnetic energy can interfere with sensitive electronic equipment such as computers and computer-driven equipment such as robots.
- Be sure all equipment in the welding area is electromagnetically compatible.
- To reduce possible interference, keep weld cables as short as possible, close together, and down low, such as on the floor.
- Locate welding operation 100 meters from any sensitive electronic equipment.
- Be sure this welding machine is installed and grounded according to this manual.
- If interference still occurs, the user must take extra measures such as moving the welding machine, using shielded cables, using line filters, or shielding the work area.

1-4. Principal Safety Standards

Safety in Welding and Cutting, ANSI Standard Z49.1, from American Welding Society, 550 N.W. LeJeune Rd, Miami FL 33126

Safety and Health Standards, OSHA 29 CFR 1910, from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Recommended Safe Practices for the Preparation for Welding and Cutting of Containers That Have Held Hazardous Substances, American Welding Society Standard AWS F4.1, from American Welding Society, 550 N.W. LeJeune Rd, Miami, FL 33126

National Electrical Code, NFPA Standard 70, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1, from Compressed Gas Association, 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202.

Code for Safety in Welding and Cutting, CSA Standard W117.2, from Canadian Standards Association, Standards Sales, 178 Rexdale Boulevard, Rexdale, Ontario, Canada M9W 1R3.

Safe Practices For Occupation And Educational Eye And Face Protection, ANSI Standard Z87.1, from American National Standards Institute, 1430 Broadway, New York, NY 10018.

Cutting And Welding Processes, NFPA Standard 51B, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

1-5. EMF Information

Considerations About Welding And The Effects Of Low Frequency Electric And Magnetic Fields

Welding current, as it flows through welding cables, will cause electromagnetic fields. There has been and still is some concern about such fields. However, after examining more than 500 studies spanning 17 years of research, a special blue ribbon committee of the National Research Council concluded that: “The body of evidence, in the committee’s judgment, has not demonstrated that exposure to power-frequency electric and magnetic fields is a human-health hazard.” However, studies are still going forth and evidence continues to be examined. Until the final conclusions of the research are reached, you may wish to minimize your exposure to electromagnetic fields when welding or cutting.

To reduce magnetic fields in the workplace, use the following procedures:

1. Keep cables close together by twisting or taping them.
2. Arrange cables to one side and away from the operator.
3. Do not coil or drape cables around your body.
4. Keep welding power source and cables as far away from operator as practical.
5. Connect work clamp to workpiece as close to the weld as possible.

About Pacemakers:

Pacemaker wearers consult your doctor first. If cleared by your doctor, then following the above procedures is recommended.

SECTION 1 – CONSIGNES DE SECURITE – LIRE AVANT UTILISATION

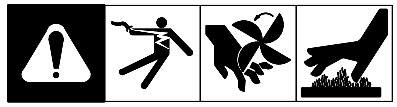
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1-1. Signification des symboles

Signifie Mise en garde ! Soyez vigilant ! Cette procédure présente des risques de danger ! Ceux-ci sont identifiés par des symboles adjacents aux directives.

▲ **Identifie un message de sécurité particulier.**

☞ *Signifie NOTA ; n'est pas relatif à la sécurité.*



Ce groupe de symboles signifie Mise en garde ! Soyez vigilant ! Il y a des risques de danger reliés aux CHOCS ÉLECTRIQUES, aux PIÈCES EN MOUVEMENT et aux PIÈCES CHAUDES. Reportez-vous aux symboles et aux directives ci-dessous afin de connaître les mesures à prendre pour éviter tout danger.

1-2. Dangers relatifs au soudage à l'arc

▲ **Les symboles présentés ci-après sont utilisés tout au long du présent manuel pour attirer votre attention et identifier les risques de danger. Lorsque vous voyez un symbole, soyez vigilant et suivez les directives mentionnées afin d'éviter tout danger. Les consignes de sécurité présentées ci-après ne font que résumer l'information contenue dans les normes de sécurité énumérées à la section 1-4. Veuillez lire et respecter toutes ces normes de sécurité.**

▲ **L'installation, l'utilisation, l'entretien et les réparations ne doivent être confiés qu'à des personnes qualifiées.**

▲ **Au cours de l'utilisation, tenir toute personne à l'écart et plus particulièrement les enfants.**



UN CHOC ÉLECTRIQUE peut tuer.

Un simple contact avec des pièces électriques peut provoquer une électrocution ou des blessures graves. L'électrode et le circuit de soudage sont sous tension dès que l'appareil est sur ON. Le circuit d'entrée et les circuits internes de l'appareil sont également sous tension à ce moment-là. En soudage semi-automatique ou automatique, le fil, le dévidoir, le logement des galets d'entraînement et les pièces métalliques en contact avec le fil de soudage sont sous tension. Des matériels mal installés ou mal mis à la terre présentent un danger.

- Ne jamais toucher les pièces électriques sous tension.
- Porter des gants et des vêtements de protection secs ne comportant pas de trous.
- S'isoler de la pièce et de la terre au moyen de tapis ou d'autres moyens isolants suffisamment grands pour empêcher le contact physique éventuel avec la pièce ou la terre.
- Ne pas se servir de source électrique àcourant électrique dans les zones humides, dans les endroits confinés ou là où on risque de tomber.
- Se servir d'une source électrique àcourant électrique UNIQUEMENT si le procédé de soudage le demande.
- Si l'utilisation d'une source électrique àcourant électrique s'avère nécessaire, se servir de la fonction de télécommande si l'appareil en est équipé.
- Couper l'alimentation ou arrêter le moteur avant de procéder à l'installation, à la réparation ou à l'entretien de l'appareil. Déverrouiller l'alimentation selon la norme OSHA 29 CFR 1910.147 (voir normes de sécurité).
- Installer et mettre à la terre correctement cet appareil conformément à son manuel d'utilisation et aux codes nationaux, provinciaux et municipaux.
- Toujours vérifier la terre du cordon d'alimentation – Vérifier et s'assurer que le fil de terre du cordon d'alimentation est bien raccordé à la borne de terre du sectionneur ou que la fiche du cordon est raccordée à une prise correctement mise à la terre.
- En effectuant les raccordements d'entrée fixer d'abord le conducteur de mise à la terre approprié et contre-vérifier les connexions.
- Vérifier fréquemment le cordon d'alimentation pour voir s'il n'est pas endommagé ou dénudé – remplacer le cordon immédiatement s'il est endommagé – un câble dénudé peut provoquer une électrocution.
- Mettre l'appareil hors tension quand on ne l'utilise pas.
- Ne pas utiliser des câbles usés, endommagés, de grosseur insuffisante ou mal épissés.
- Ne pas enrouler les câbles autour du corps.
- Si la pièce soudée doit être mise à la terre, le faire directement avec un câble distinct.
- Ne pas toucher l'électrode quand on est en contact avec la pièce, la terre ou une électrode provenant d'une autre machine.
- N'utiliser qu'un matériel en bon état. Réparer ou remplacer sur-le-champ les pièces endommagées. Entretenir l'appareil conformément à ce manuel.
- Porter un harnais de sécurité quand on travaille en hauteur.
- Maintenir solidement en place tous les panneaux et capots.
- Fixer le câble de retour de façon à obtenir un bon contact métal-métal avec la pièce à souder ou la table de travail, le plus près possible de la soudure.
- Isoler la pince de masse quand pas mis à la pièce pour éviter le contact avec tout objet métallique.

Il y a DU COURANT CONTINU IMPORTANT dans les convertisseurs après la suppression de l'alimentation électrique.

- Arrêter les convertisseurs, débrancher le courant électrique, et décharger les condensateurs d'alimentation selon les instructions indiquées dans la partie entretien avant de toucher les pièces.



LES FUMÉES ET LES GAZ peuvent être dangereux.

Le soudage génère des fumées et des gaz. Leur inhalation peut être dangereux pour votre santé.

- Eloigner votre tête des fumées. Ne pas respirer les fumées.
- A l'intérieur, ventiler la zone et/ou utiliser un échappement au niveau de l'arc pour l'évacuation des fumées et des gaz de soudage.
- Si la ventilation est insuffisante, utiliser un respirateur à alimentation d'air homologué.
- Lire les spécifications de sécurité des matériaux (MSDSs) et les instructions du fabricant concernant les métaux, les consommables, les revêtements, les nettoyants et les dégraisseurs.
- Travailler dans un espace fermé seulement s'il est bien ventilé ou en portant un respirateur à alimentation d'air. Demander toujours à un surveillant dûment formé de se tenir à proximité. Des fumées et des gaz de soudage peuvent déplacer l'air et abaisser le niveau d'oxygène provoquant des blessures ou des accidents mortels. S'assurer que l'air de respiration ne présente aucun danger.
- Ne pas souder dans des endroits situés à proximité d'opérations de dégraissage, de nettoyage ou de pulvérisation. La chaleur et les rayons de l'arc peuvent réagir en présence de vapeurs et former des gaz hautement toxiques et irritants.
- Ne pas souder des métaux munis d'un revêtement, tels que l'acier galvanisé, plaqué en plomb ou au cadmium à moins que le revêtement n'ait été enlevé dans la zone de soudure, que l'endroit soit bien ventilé, et si nécessaire, en portant un respirateur à alimentation d'air. Les revêtements et tous les métaux renfermant ces éléments peuvent dégager des fumées toxiques en cas de soudage.



LES RAYONS DE L’ARC peuvent provoquer des brûlures dans les yeux et sur la peau.

Le rayonnement de l’arc du procédé de soudage génère des rayons visibles et invisibles intenses (ultraviolets et infrarouges) susceptibles de provoquer des brûlures dans les yeux et sur la peau. Des étincelles sont projetées pendant le soudage.

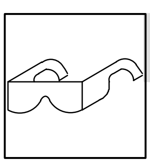
- Porter un casque de soudage muni d’un écran de filtre approprié pour protéger votre visage et vos yeux pendant le soudage ou pour regarder (voir ANSI Z49.1 et Z87.1 énuméré dans les normes de sécurité).
- Porter des protections approuvés pour les oreilles si le niveau sondre est trop élevé.
- Utiliser des écrans ou des barrières pour protéger des tiers de l’éclair et de l’éblouissement; demander aux autres personnes de ne pas regarder l’arc.
- Porter des vêtements de protection constitué dans une matière durable, résistant au feu (cuir ou laine) et une protection des pieds.



LE SOUDAGE peut provoquer un incendie ou une explosion.

Le soudage effectué sur des conteneurs fermés tels que des réservoirs, tambours ou des conduites peut provoquer leur éclatement. Des étincelles peuvent être projetées de l’arc de soudure. La projection d’étincelles, des pièces chaudes et des équipements chauds peut provoquer des incendies et des brûlures. Le contact accidentel de l’électrode avec des objets métalliques peut provoquer des étincelles, une explosion, un surchauffement ou un incendie. Avant de commencer le soudage, vérifier et s’assurer que l’endroit ne présente pas de danger.

- Se protéger et d’autres personnes de la projection d’étincelles et de métal chaud.
- Ne pas souder dans un endroit là où des étincelles peuvent tomber sur des substances inflammables.
- Déplacer toutes les substances inflammables à une distance de 10,7 m de l’arc de soudage. En cas d’impossibilité les recouvrir soigneusement avec des protections homologués.
- Des étincelles et des matériaux chauds du soudage peuvent facilement passer dans d’autres zones en traversant de petites fissures et des ouvertures.
- Surveiller tout déclenchement d’incendie et tenir un extincteur à proximité.
- Le soudage effectué sur un plafond, plancher, paroi ou séparation peut déclencher un incendie de l’autre côté.
- Ne pas effectuer le soudage sur des conteneurs fermés tels que des réservoirs, tambours, ou conduites, à moins qu’ils n’aient été préparés correctement conformément à AWS F4.1 (voir les normes de sécurité).
- Brancher le câble sur la pièce le plus près possible de la zone de soudage pour éviter le transport du courant sur une longue distance par des chemins inconnus éventuels en provoquant des risques d’électrocution et d’incendie.
- Ne pas utiliser le poste de soudage pour dégeler des conduites gelées.
- En cas de non utilisation, enlever la baguette d’électrode du porte-électrode ou couper le fil à la pointe de contact.
- Porter des vêtements de protection dépourvus d’huile tels que des gants en cuir, une chemise en matériau lourd, des pantalons sans revers, des chaussures hautes et un couvre chef.
- Avant de souder, retirer toute substance combustible de vos poches telles qu’un allumeur au butane ou des allumettes.



DES PARTICULES VOLANTES peuvent blesser les yeux.

- Le soudage, l’écaillement, le passage de la pièce à la brosse en fil de fer, et le meulage génèrent des étincelles et des particules métalliques volantes. Pendant la période de refroidissement des soudures, elles risquent de projeter du laitier.
- Porter des lunettes de sécurité avec écrans latéraux ou un écran facial.



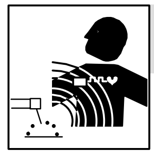
LES ACCUMULATIONS DE GAZ risquent de provoquer des blessures ou même la mort.

- Fermer l’alimentation du gaz protecteur en cas de non utilisation.
- Veiller toujours à bien aérer les espaces confinés ou se servir d’un respirateur d’adduction d’air homologué.



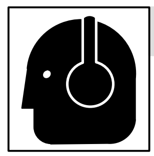
DES PIÈCES CHAUDES peuvent provoquer des brûlures graves.

- Ne pas toucher des parties chaudes à mains nues
- Prévoir une période de refroidissement avant d’utiliser le pistolet ou la torche.



LES CHAMPS MAGNÉTIQUES peuvent affecter les stimulateurs cardiaques.

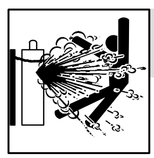
- Porteurs de stimulateur cardiaque, restez à distance.
- Les porteurs d’un stimulateur cardiaque doivent d’abord consulter leur médecin avant de s’approcher des opérations de soudage à l’arc, de gougeage ou de soudage par points.



LE BRUIT peut affecter l’ouïe.

Le bruit des processus et des équipements peut affecter l’ouïe.

- Porter des protections approuvés pour les oreilles si le niveau sondre est trop élevé.



Si des BOUTEILLES sont endommagées, elles pourront exploser.

Des bouteilles de gaz protecteur contiennent du gaz sous haute pression. Si une bouteille est endommagée, elle peut exploser. Du fait que les bouteilles de gaz font normalement partie du procédé de soudage, les manipuler avec précaution.

- Protéger les bouteilles de gaz comprimé d’une chaleur excessive, des chocs mécaniques, du laitier, des flammes ouvertes, des étincelles et des arcs.
- Placer les bouteilles debout en les fixant dans un support stationnaire ou dans un porte-bouteilles pour les empêcher de tomber ou de se renverser.
- Tenir les bouteilles éloignées des circuits de soudage ou autres circuits électriques.
- Ne jamais placer une torche de soudage sur une bouteille à gaz.
- Une électrode de soudage ne doit jamais entrer en contact avec une bouteille.
- Ne jamais souder une bouteille pressurisée – risque d’explosion.
- Utiliser seulement des bouteilles de gaz protecteur, régulateurs, tuyaux et raccords convenables pour cette application spécifique; les maintenir ainsi que les éléments associés en bon état.
- Ne pas tenir la tête en face de la sortie en ouvrant la soupape de la bouteille.
- Maintenir le chapeau de protection sur la soupape, sauf en cas d’utilisation ou de branchement de la bouteille.
- Lire et suivre les instructions concernant les bouteilles de gaz comprimé, les équipements associés et les publications P-1 CGA énumérées dans les normes de sécurité.

1-3. Dangers supplémentaires en relation avec l'installation, le fonctionnement et la maintenance



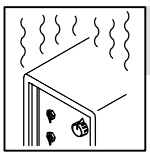
Risque D'INCENDIE OU D'EXPLOSION.

- Ne pas placer l'appareil sur, au-dessus ou à proximité de surfaces infllammables.
- Ne pas installer l'appareil à proximité de produits inflammables
- Ne pas surcharger l'installation électrique – s"assurer que l'alimentation est correctement dimensionné et protégé avant de mettre l'appareil en service.



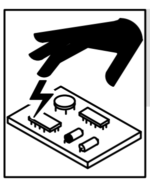
LA CHUTE DE L'APPAREIL peut blesser.

- Utiliser l'anneau de levage uniquement pour soulever l'appareil, NON PAS les chariot, les bouteilles de gaz ou tout autre accessoire.
- Utiliser un engin d'une capacité appropriée pour soulever l'appareil.
- En utilisant des fourches de levage pour déplacer l'unité, s'assurer que les fourches sont suffisamment longues pour dépasser du côté opposé de l'appareil.



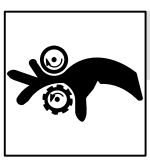
L'EMPLOI EXCESSIF peut SURCHAUFFER L'ÉQUIPEMENT.

- Prévoir une période de refroidissement, respecter le cycle opératoire nominal.
- Réduire le courant ou le cycle opératoire avant de recommancer le soudage.
- Ne pas obstruer les passages d'air du poste.



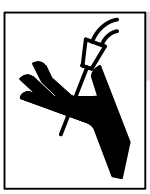
LES CHARGES ÉLECTROSTATIQUES peuvent endommager les circuits imprimés.

- Établir la connexion avec la barrette de terre avant de manipuler des cartes ou des pièces.
- Utiliser des pochettes et des boîtes antistatiques pour stocker, déplacer ou expédier des cartes de circuits imprimes.



DES ORGANES MOBILES peuvent provoquer des blessures.

- Ne pas s'approcher des organes mobiles.
- Ne pas s'approcher des points de coincement tels que des rouleaux de commande.



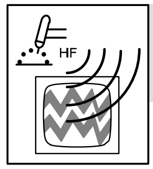
LES FILS DE SOUDAGE peuvent provoquer des blessures.

- Ne pas appuyer sur la gachette avant d'en avoir reçu l'instruction.
- Ne pas diriger le pistolet vers soi, d'autres personnes ou toute pièce mécanique en engageant le fil de soudage.



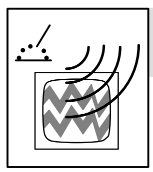
DES ORGANES MOBILES peuvent provoquer des blessures.

- Rester à l'écart des organes mobiles comme le ventilateur.
- Maintenir fermés et fixement en place les portes, panneaux, recouvrements et dispositifs de protection.



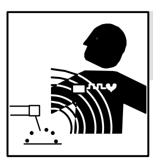
LE RAYONNEMENT HAUTE FRÉQUENCE (H.F.) risque de provoquer des interférences.

- Le rayonnement haute frequence peut provoquer des interférences avec les équipements de radio–navigation et de communication, les services de sécurité et les ordinateurs.
- Demander seulement à des personnes qualifiées familiarisées avec des équipements électroniques de faire fonctionner l'installation.
- L'utilisateur est tenu de faire corriger rapidement par un électricien qualifié les interférences résultant de l'installation.
- Si le FCC signale des interférences, arrêter immédiatement l'appareil.
- Effectuer régulièrement le contrôle et l'entretien de l'installation.
- Maintenir soigneusement fermés les portes et les panneaux des sources de haute fréquence, maintenir les éclateurs à une distance correcte et utiliser une terre et et un blindage pour réduire les interférences éventuelles.



LE SOUDAGE À L'ARC risque de provoquer des interférences.

- L'énergie électromagnétique risque de provoquer des interférences pour l'équipement électronique sensible tel que les ordinateurs et l'équipement commandé par ordinateur tel que les robots.
- Veiller à ce que tout l'équipement de la zone de soudage soit compatible électromagnétiquement.
- Pour réduire la possibilité d'interférence, maintenir les câbles de soudage aussi courts que possible, les grouper, et les poser aussi bas que possible (ex. par terre).
- Veiller à souder à une distance de 100 mètres de tout équipement électronique sensible.
- Veiller à ce que ce poste de soudage soit posé et mis à la terre conformément à ce mode d'emploi.
- En cas d'interférences après avoir pris les mesures précédentes, il incombe à l'utilisateur de prendre des mesures supplémentaires telles que le déplacement du poste, l'utilisation de câbles blindés, l'utilisation de filtres de ligne ou la pose de protecteurs dans la zone de travail.



LES CHAMPS MAGNÉTIQUES peuvent affecter les stimulateurs cardiaques.

- Porteurs de stimulateur cardiaque, restez à distance.
- Les porteurs d'un stimulateur cardiaque doivent d'abord consulter leur médecin avant de s'approcher des opérations de soudage à l'arc, de gougeage ou de soudage par points.

1-4. Principales normes de sécurité

Safety in Welding and Cutting, norme ANSI Z49.1, de l'American Welding Society, 550 N.W. Lejeune Rd, Miami FL 33126

Safety and Health Sandards, OSHA 29 CFR 1910, du Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Recommended Safe Practice for the Preparation for Welding and Cutting of Containers That Have Held Hazardous Substances, norme AWS F4.1, de l'American Welding Society, 550 N.W. Lejeune Rd, Miami FL 33126

National Electrical Code, NFPA Standard 70, de la National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1, de la Compressed Gas Association, 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202.

Règles de sécurité en soudage, coupage et procédés connexes, norme CSA W117.2, de l'Association canadienne de normalisation, vente de normes, 178 Rexdale Boulevard, Rexdale (Ontario) Canada M9W 1R3.

Safe Practices For Occupation And Educational Eye And Face Protection, norme ANSI Z87.1, de l'American National Standards Institute, 1430 Broadway, New York, NY 10018.

Cutting and Welding Processes, norme NFPA 51B, de la National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

1-5. Information sur les champs électromagnétiques

Données sur le soudage électrique et sur les effets, pour l'organisme, des champs magnétiques basse fréquence

Le courant de soudage, pendant son passage dans les câbles de soudage, causera des champs électromagnétiques. Il y a eu et il y a encore un certain souci à propos de tels champs. Cependant, après avoir examiné plus de 500 études qui ont été faites pendant une période de recherche de 17 ans, un comité spécial ruban bleu du National Research Council a conclu: "L'accumulation de preuves, suivant le jugement du comité, n'a pas démontré que l'exposition aux champs magnétiques et champs électriques à haute fréquence représente un risque à la santé humaine". Toutefois, des études sont toujours en cours et les preuves continuent à être examinées. En attendant que les conclusions finales de la recherche soient établies, il vous serait souhaitable de réduire votre exposition aux champs électromagnétiques pendant le soudage ou le coupage.

Afin de réduire les champs électromagnétiques dans l'environnement de travail, respecter les consignes suivantes :

1 Garder les câbles ensembles en les torsadant ou en les attachant avec du ruban adhésif.

2 Mettre tous les câbles du côté opposé de l'opérateur.

3 Ne pas courber pas et ne pas entourer pas les câbles autour de votre corps.

4 Garder le poste de soudage et les câbles le plus loin possible de vous.

5 Relier la pince de masse le plus près possible de la zone de soudure.

Consignes relatives aux stimulateurs cardiaques :

Les personnes qui portent un stimulateur cardiaque doivent avant tout consulter leur docteur. Si vous êtes déclaré apte par votre docteur, il est alors recommandé de respecter les consignes ci–dessus.

SECTION 2 – DEFINITIONS (CE Models Only)

2-1. Warning Label Definitions



Warning! Watch Out! There are possible hazards as shown by the symbols.

1 Electric shock from welding electrode or wiring can kill.

1.1 Wear dry insulating gloves. Do not touch electrode with bare hand. Do not wear wet or damaged gloves.

1.2 Protect yourself from electric shock by insulating yourself from work and ground.

1.3 Disconnect input plug or power before working on machine.

2 Breathing welding fumes can be hazardous to your health.

2.1 Keep your head out of the fumes.

2.2 Use forced ventilation or local exhaust to remove the fumes.

2.3 Use ventilating fan to remove fumes.

3 Welding sparks can cause explosion or fire.

3.1 Keep flammables away from welding. Do not weld near flammables.

3.2 Welding sparks can cause fires. Have a fire extinguisher nearby, and have a watchperson ready to use it.

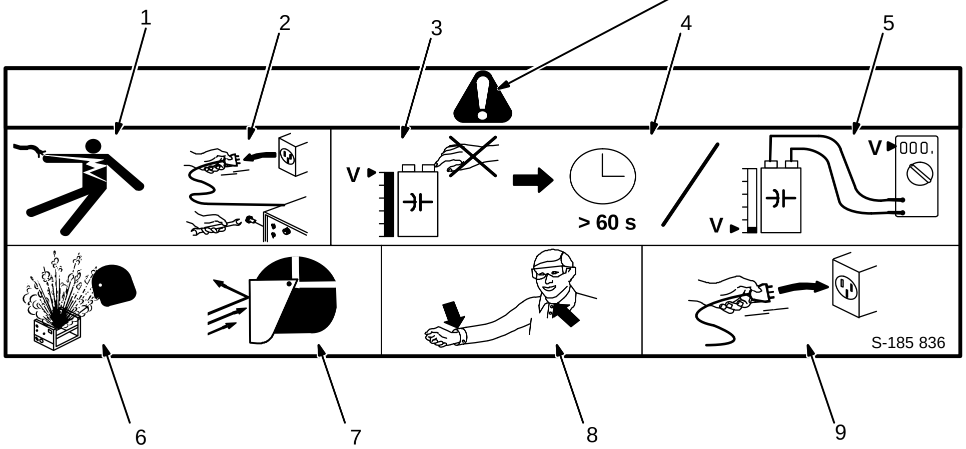
3.3 Do not weld on drums or any closed containers.

4 Arc rays can burn eyes and injure skin.

4.1 Wear hat and safety glasses. Use ear protection and button shirt collar. Use welding helmet with correct shade of filter. Wear complete body protection.

5 Become trained and read the instructions before working on the machine or welding.

6 Do not remove or paint over (cover) the label.



Warning! Watch Out! There are possible hazards as shown by the symbols.

1 Electric shock from wiring can kill.

2 Disconnect input plug or power before working on machine.

3 Hazardous voltage remains on input capacitors after power is turned off. Do not touch fully charged capacitors.

4 Always wait 60 seconds after power is turned off before working on unit, OR

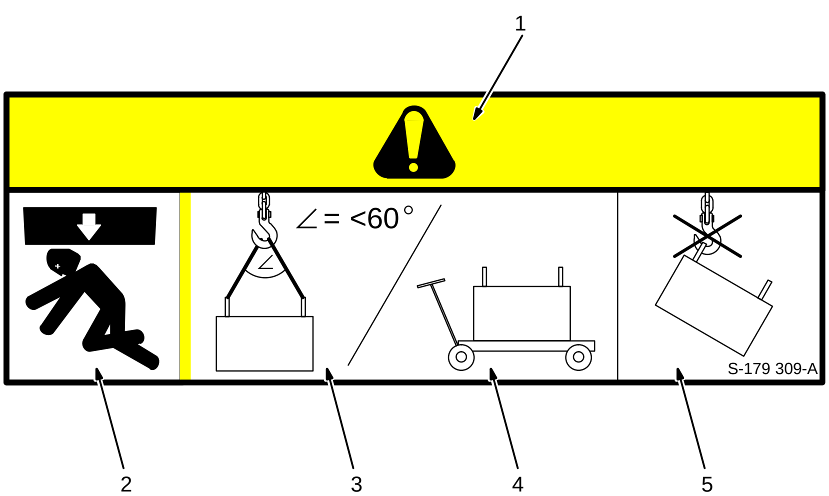
5 Check input capacitor voltage, and be sure it is near 0 before touching any parts.

6 When power is applied failed parts can explode or cause other parts to explode.

7 Flying pieces of parts can cause injury. Always wear a face shield when servicing unit.

8 Always wear long sleeves and button your collar when servicing unit.

9 After taking proper precautions as shown, connect power to unit.



1 Warning! Watch Out! There are possible hazards as shown by the symbols.

2 Falling equipment can cause injury and damage to unit.

3 Always lift and support unit using both handles. Keep angle of lifting device less than 60 degrees.

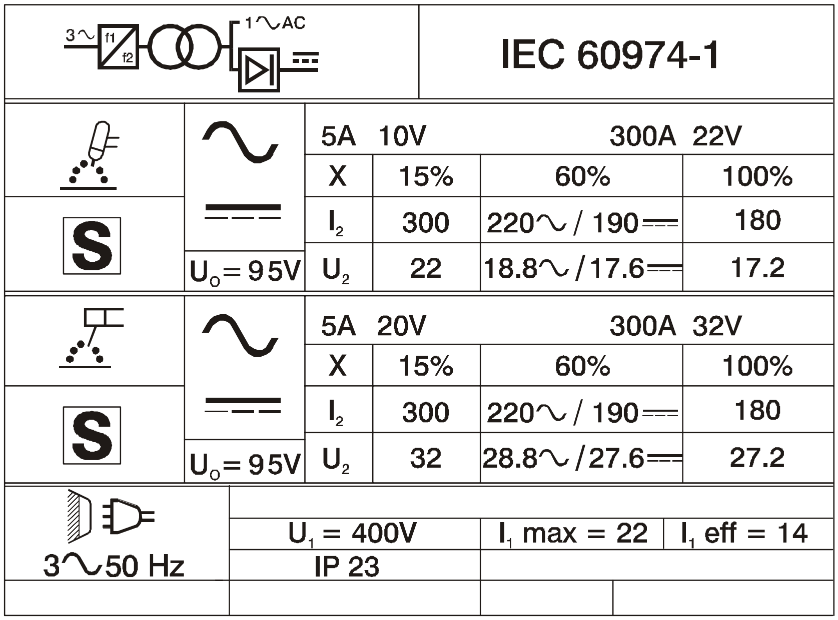
4 Use a proper cart to move unit.

5 Do not use one handle to lift or support unit.

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2-2. Manufacturer's Rating Label For CE Products Only

☞ *For label location see Section 3-4.*



		IEC 60974-1			
		5A 10V		300A 22V	
		X	15%	60%	100%
S		I_2	300	220~ / 190=	180
	U_0 = 95V	U_2	22	18.8~ / 17.6=	17.2
		5A 20V		300A 32V	
		X	15%	60%	100%
S		I_2	300	220~ / 190=	180
	U_0 = 95V	U_2	32	28.8~ / 27.6=	27.2
3~50 Hz		U_1 = 400V		I_1 max = 22	I_1 eff = 14
		IP 23			

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2-3. Symbols And Definitions

Symbol	Definition	Symbol	Definition	Symbol	Definition	Symbol	Definition
A	Amperes		Panel–Local		Gas Tungsten Arc Welding (GTAW)		Shielded Metal Arc Welding (SMAW)
V	Volts	V	Input	3~ 1~ AC	3 Phase Static Frequency Converter-Transformer-Rectifier		
V	Output		Circuit Breaker		Remote		Lift-Arc (GTAW)
	Protective Earth (Ground)	t2	Postflow Timer	t1	Preflow Timer	S	Seconds
I	On	O	Off	+	Positive	—	Negative
~	Alternating Current		Gas Input		Gas Output	I_2	Rated Welding Current
X	Duty Cycle		Direct Current		Line Connection	U_2	Conventional Load Voltage
U_1	Primary Voltage	IP	Degree Of Protection	I_{1max}	Rated Maximum Supply Current	I_{1eff}	Maximum Effective Supply Current
U_0	Rated No Load Voltage (Average)	A	Pulse Background Amperage	A	Initial Amperage		Increase/Decrease Of Quantity
	Normal Trigger Operation (GTAW)		Two-Step Trigger Operation (GTAW)		Four-Step Trigger Operation (GTAW)	%	Percent
Hz	Hertz	M	Recall From Memory		Arc Force (DIG)		Impulse Starting (GTAW)
t	Final Slope	A	Final Amperage	%	Pulse Percent On Time	t	Initial Slope
V I	Contactor Control (Stick)		Pulser	A	TIG Weld Amps And Peak Amps While Pulsing	f	Pulse Frequency
	Work		Electrode	+ – %	Balance % EN Time (AC GTAW)		Process
S	Unit may be used in environments with increased hazard of electric shock		Sequence		Adjust		

SECTION 3 – INSTALLATION

3-1. Specifications

A. For Multivoltage Units

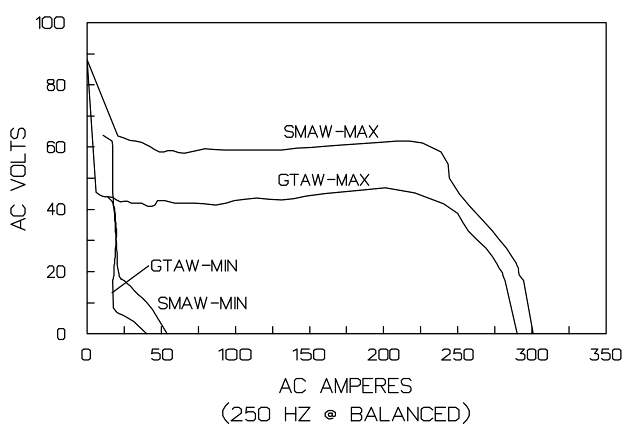
Input Power	Rated Welding Output	Amperage Range	Maximum Open-Circuit Voltage DC	Amperes Input at Rated Load Output 60 Hz			
				230 V	460 V	KVA	KW
Three Phase	250 A @ 30 Volts AC, 40% Duty Cycle	5–300	95	26.3 *.27	17.9 *.15	14.2 *.09	10.5 *.04
	200 A @ 28 Volts DC, 40% Duty Cycle			20.5 *.27	13.4 *.15	8.4 *.09	7.6 *.04
Single Phase	250 A @ 30 Volts AC, 40% Duty Cycle	5–300	95	62.6 *.33	32.2 *.18	14.8 *.10	10.4 *.07
	200 A @ 28 Volts DC, 40% Duty Cycle			44 *.33	25.8 *.18	11.9 *.1	8.1 *.07
*While idling							

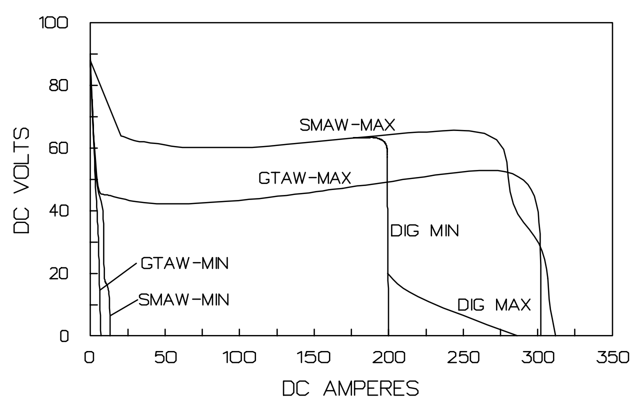
B. For Single Voltage Units

Rated Welding Output	Amperage Range	Maximum Open-Circuit Voltage DC	Amperes Input At Rated Output, 50Hz - Three-Phase 400 V	KVA	KW
250 A @ 30 VAC, 40% Duty Cycle	5 – 300	95 VDC	20.2 (0.13*)	14.0 (0.09*)	10.5 (0.04*)
200 A @ 28 VDC, 40% Duty Cycle	5 – 300	95 VDC	15.1 (0.13*)	10.5 (0.09*)	7.5 (0.04*)
*While idling					

3-2. Volt-Ampere Curves

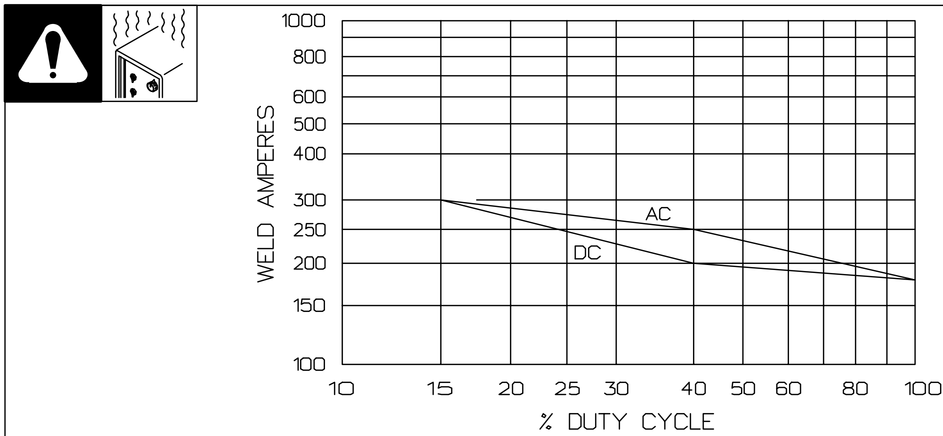
Volt-ampere curves show minimum and maximum voltage and amperage output capabilities of unit. Curves of other settings fall between curves shown.





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3-3. Duty Cycle and Overheating

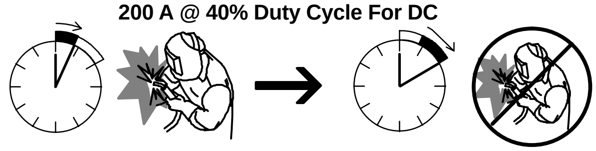


Duty Cycle is the percentage of 10 minutes that unit can weld at rated load without overheating.

If unit overheats, output stops, a Help message is displayed (see Section 5-3), and cooling fan runs. Wait fifteen minutes for unit to cool. Reduce amperage or voltage, or duty cycle before welding.

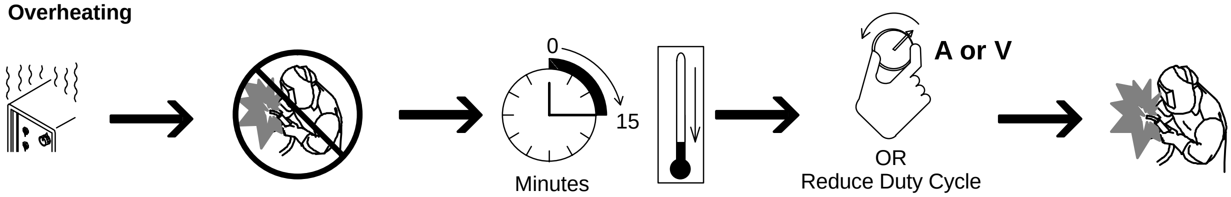
▲ **Exceeding duty cycle can damage unit and void warranty.**

250 A @ 40% Duty Cycle For AC
200 A @ 40% Duty Cycle For DC



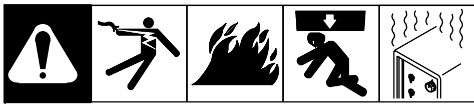
4 Minutes Welding   6 Minutes Resting

Overheating



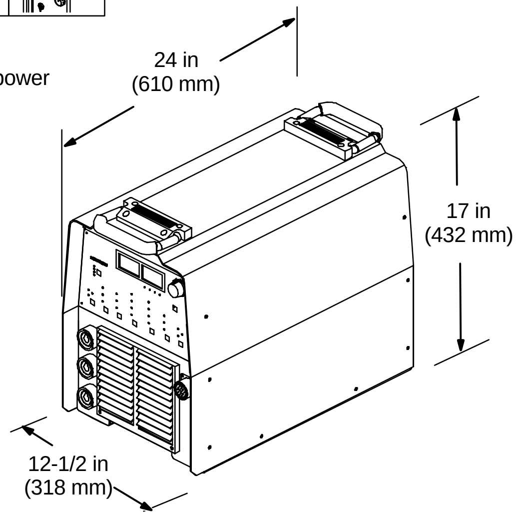
sduty1 5/95 / SA-185 794

3-4. Selecting a Location



Dimensions And Weight

90 lb (40.7 kg) – 110 lb (50kg) w/aux power



1 Lifting Handles

Use handles to lift unit.

2 Hand Cart

Use cart or similar device to move unit.

3 Rating Label (Non CE Models)

Use rating label to determine input power needs.

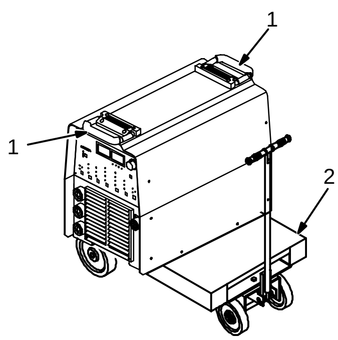
4 Plate Label (CE Models)

5 Line Disconnect Device

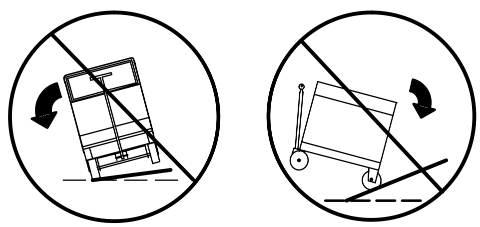
Locate unit near correct input power supply.

▲ **Special installation may be required where gasoline or volatile liquids are present – see NEC Article 511 or CEC Section 20.**

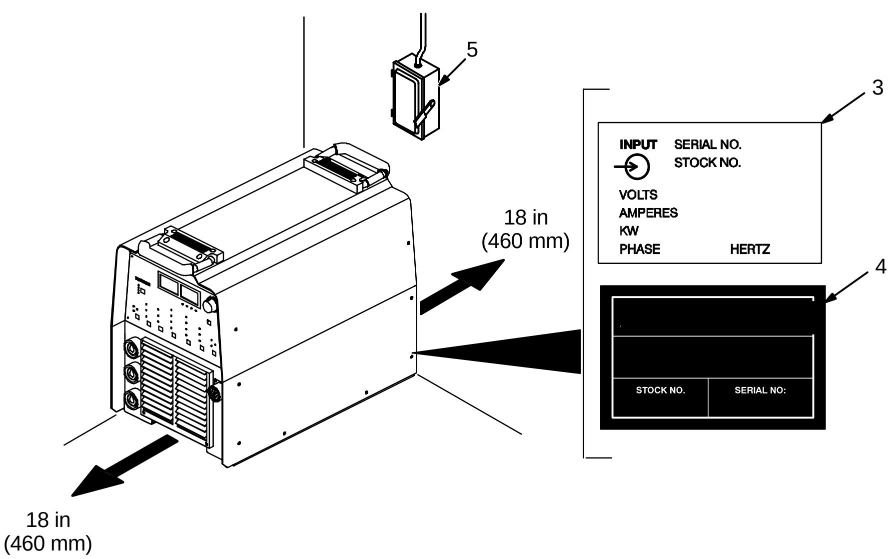
Movement



▲ **Do not move or operate unit where it could tip.**

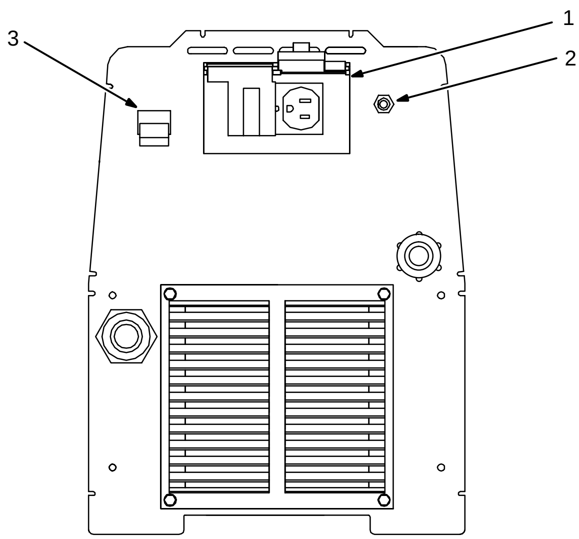


Location And Airflow



loc_2 3/96 - ST-802 135-B

3-5. 115 Volts AC Duplex Receptacle, Circuit Breaker CB1 (Optional), And Power Switch



1 AC Duplex Receptacle

115 V 10 A for 230/460 volt models.
115 V 7 A for 400 volt models.

2 Circuit Breaker CB1

CB1 protects duplex receptacle from overload.

Press button to reset breaker.

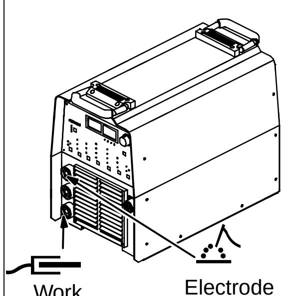
3 Power On/Off Switch

ST-801 866-A

3-6. Weld Output Terminals And Selecting Cable Sizes*

▲ **ARC WELDING can cause Electromagnetic Interference.**

To reduce possible interference, keep weld cables as short as possible, close together, and down low, such as on the floor. Locate welding operation 100 meters from any sensitive electronic equipment. Be sure this welding machine is installed and grounded according to this manual. If interference still occurs, the user must take extra measures such as moving the welding machine, using shielded cables, using line filters, or shielding the work area.

Weld Output Terminals ▲ **Turn off power before connecting to weld output terminals.** ▲ **Do not use worn, damaged, undersized, or poorly spliced cables.**	**Welding Amps******	**Weld Cable Size** and Total Cable (Copper) Length in Weld Circuit Not Exceeding**							
		100 ft (30 m) or Less		**150 ft (45 m)**	**200 ft (60 m)**	**250 ft (70 m)**	**300 ft (90 m)**	**350 ft (105 m)**	**400 ft (120 m)**
		10 – 60% Duty Cycle	**60 – 100% Duty Cycle**	**10 – 100% Duty Cycle**					
 Work, Electrode	100	4 (20)	4 (20)	4 (20)	3 (30)	2 (35)	1 (50)	1/0 (60)	1/0 (60)
	150	3 (30)	3 (30)	2 (35)	1 (50)	1/0 (60)	2/0 (70)	3/0 (95)	3/0 (95)
	200	3 (30)	2 (35)	1 (50)	1/0 (60)	2/0 (70)	3/0 (95)	4/0 (120)	4/0 (120)
	250	2 (35)	1 (50)	1/0 (60)	2/0 (70)	3/0 (95)	4/0 (120)	2 ea. 2/0 (2x70)	2 ea. 2/0 (2x70)
	300	1 (50)	1/0 (60)	2/0 (70)	3/0 (95)	4/0 (120)	2 ea. 2/0 (2x70)	2 ea. 3/0 (2x95)	2 ea. 3/0 (2x95)
	350	1/0 (60)	2/0 (70)	3/0 (95)	4/0 (120)	2 ea. 2/0 (2x70)	2 ea. 3/0 (2x95)	2 ea. 3/0 (2x95)	2 ea. 4/0 (2x120)

* This chart is a general guideline and may not suit all applications. If cable overheating occurs (normally you can smell it), use next size larger cable.

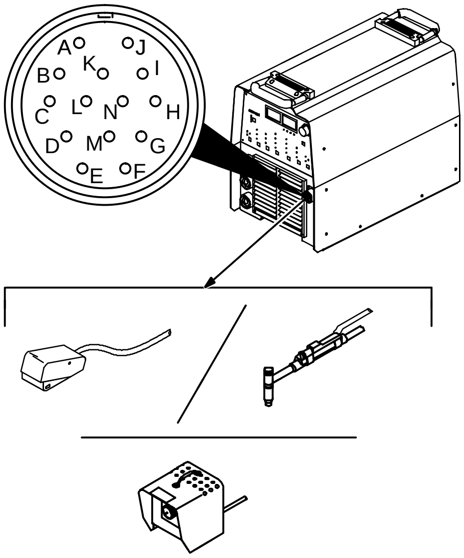
**Weld cable size (AWG) is based on either a 4 volts or less drop or a current density of at least 300 circular mils per ampere.
( ) = mm^2 for metric use

S-0007-E–

***Select weld cable size for pulsing application at peak amperage value.

3-7. Remote 14 Receptacle Information

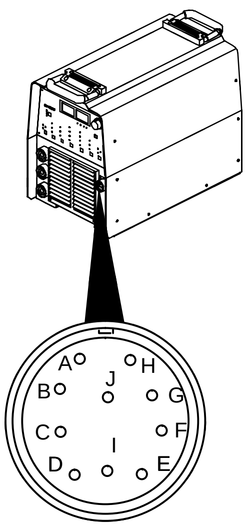
ST-802 135-B



REMOTE 14	Socket*	Socket Information
24 VOLTS DC OUTPUT (CONTACTOR)	A	Contactor control, 24 volts dc.
	B	Contact closure to A completes 24 volts dc contactor control circuit, and enables output.
REMOTE OUTPUT CONTROL	C	Output to remote control; 0 to +10 volts dc output to remote control.
	D	Remote control circuit common.
	E	0 to +10 volts dc input command signal from remote control.
A/V AMPERAGE VOLTAGE	F	Current feedback; +1 volt dc per 100 amperes.
	H	Voltage feedback; +1 volt dc per 10 output receptacle volts.
GND	K	Chassis common.

*The remaining sockets are not used.

3-8. Remote Program Select Inputs (Optional For DX Models)



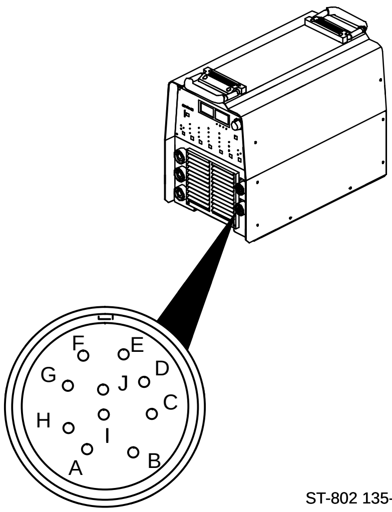
ST-802 135-B

*The remaining sockets are not used.

10-Pin Receptacle RC2					
Pin Designations 0=No Connection 1=Connected To Ground (Pin G)					
Function	C	H	F	E	D
No Remote Control	0	0	0	X	X
Stick EP Of Current Program	1	0	0	X	X
Stick AC Of Current Program	1	1	0	x	x
TIG AC Of Current Program	0	1	0	x	x
Program 1 Stick EP	1	0	1	0	0
Program 2 Stick EP	1	0	1	0	1
Program 3 Stick EP	1	0	1	1	0
Program 4 Stick EP	1	0	1	1	1
Program 1 TIG EN	0	0	1	0	0
Program 2 TIG EN	0	0	1	0	1
Program 3 TIG EN	0	0	1	1	0
Program 4 TIG EN	0	0	1	1	1
Program 1 Stick AC	1	1	1	0	0
Program 2 Stick AC	1	1	1	0	1
Program 3 Stick AC	1	1	1	1	0
Program 4 Stick AC	1	1	1	1	1
Program 1 TIG AC	0	1	1	0	0
Program 2 TIG AC	0	1	1	0	1
Program 3 TIG AC	0	1	1	1	0
Program 4 TIG AC	0	1	1	1	1
Socket A	Contactor control, 24 volts dc				
Socket B	Contact closure to A, completes 24 volts dc contactor control circuit and enables output				
Socket G	Chassis ground				
Socket I	Normally open valid arc relay				
Socket J	Circuit common for valid arc relay				

To use the Remote Process Select function for a given program, select the TIG process on the front panel while the desired program is selected.

3-9. Automation Connection (LX Models Only)

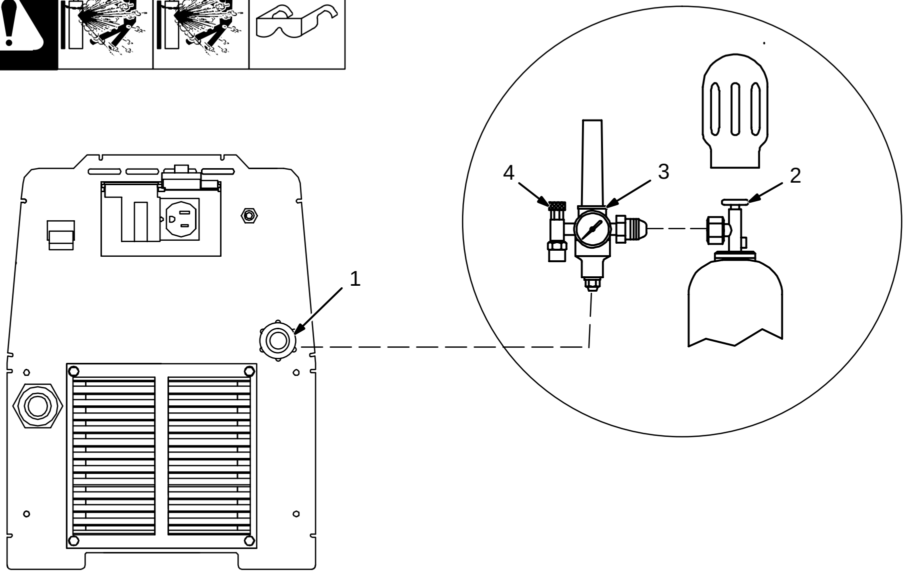


ST-802 135-B

Socket	Socket Information For 10-Pin Receptacle RC2
A	Start/Stop
B	Gas
C	Output disable
D	Chassis ground
E	Final slope – collector
F	Final slope – emitter
G	Pulse lockout – collector
H	Pulse lockout – emitter
I	Valid arc – collector
J	Valid arc – emitter

Definitions Of Inputs And Outputs
Inputs
A - Closure to D starts the weld cycle. Opening closure stops weld cycle. Durning 2T operation, a momentary closure (greater than 100ms, but less than 3/4 seconds) starts and stops weld output.
B - Closure to D turns on gas. This input will override Postflow, but if a Preflow time is entered, the Preflow cycle will time out before arc initiation.
C - Closure to D must be maintained at all times. If the closure between pins C and D is broken, an output disable occurs, Postflow begins to time out, and HELP 13 will be displayed on the meters.
Outputs
Outputs are isolated open-collector transistor which are able to conduct at least 6 mA of current, with a maximum of 100 mA of current and 30 VDC.

3-10. Gas Connections



1 Gas Fitting

Fittings have 5/8-18 right-hand threads.

2 Cylinder Valve

Open valve slightly so gas flow blows dirt from valve. Close valve.

3 Regulator/Flowmeter

4 Flow Adjust

Typical flow rate is 15 cfh (cubic feet per hour).

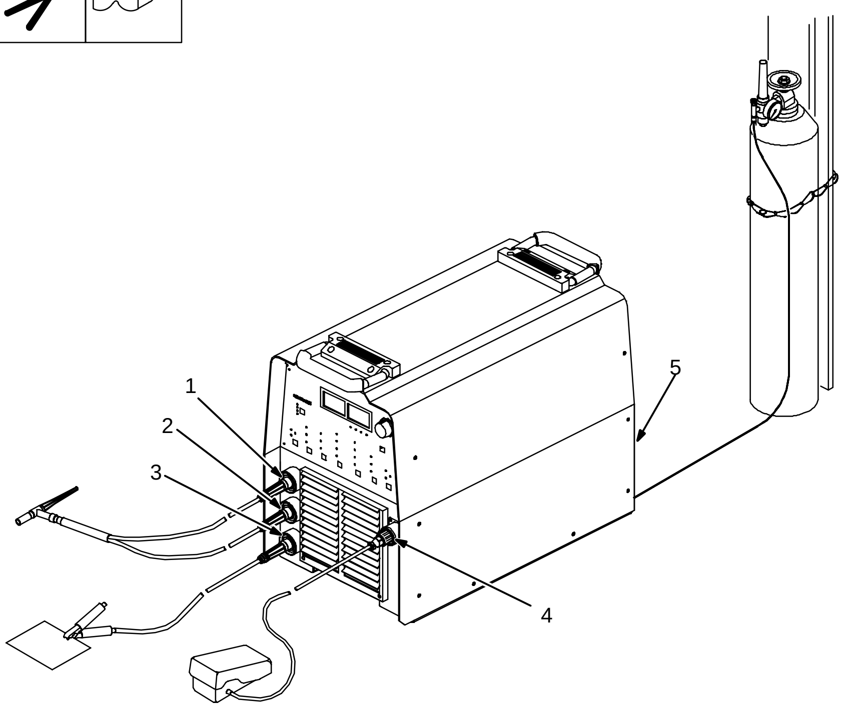
Connect customer supplied gas hose between regulator/flowmeter and gas fitting on rear of unit.

Tools Needed:

5/8, 1-1/8 in

ST-801 866

3-11. TIG HF Impulse/ Lift-Arc™ DCEN (Direct Current Electrode Negative) Connections



1 Negative (–) Weld Output Terminal

Connect TIG torch to negative weld output terminal.

2 Gas Out Connection

Connect torch gas hose to gas out fitting.

3 Positive (+) Weld Output Terminal

Connect work lead to positive weld output terminal.

4 Remote 14 Receptacle

Connect desired remote control to Remote 14 receptacle.

5 Gas In Connection

Connect gas hose from gas supply to gas in fitting.

Tools Needed:

11/16 in, (21 mm for CE units)

Ref. ST-802 680

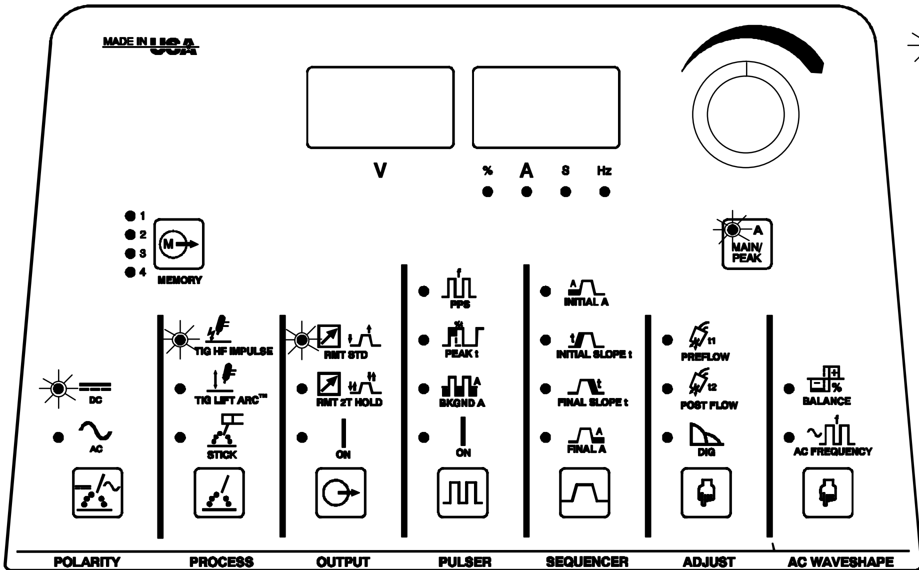
3-12. Front Panel Display For TIG HF Impulse DCEN (Direct Current Electrode Negative)

1 Front Panel

Correct front panel display for basic TIG HF Impulse DCEN welding.

☞ *For all front panel switch pad controls: press switch pad to turn on light and enable function.*

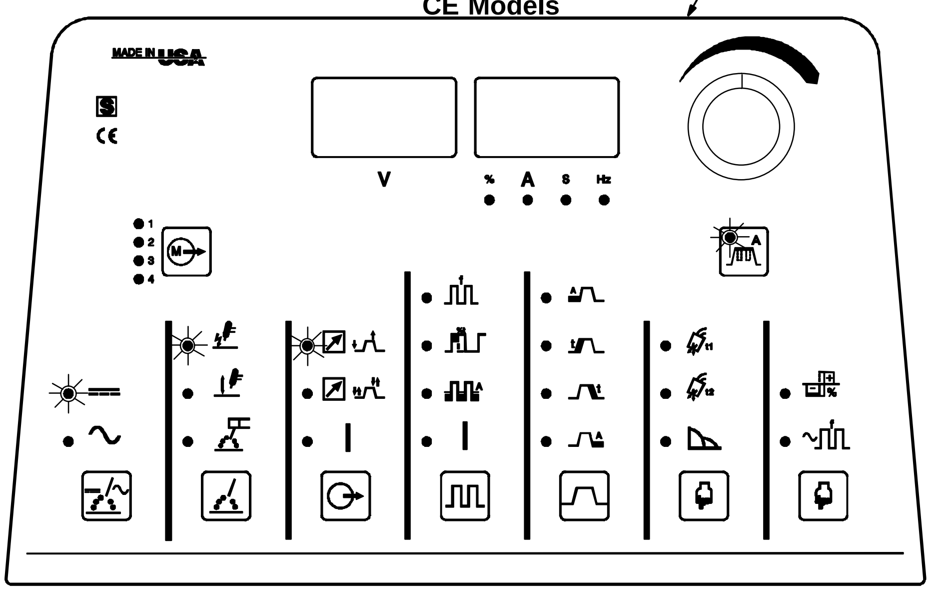
NOTE: Green on nameplate indicates a TIG function (see Section 4-1 for description of controls).



ST-198 708

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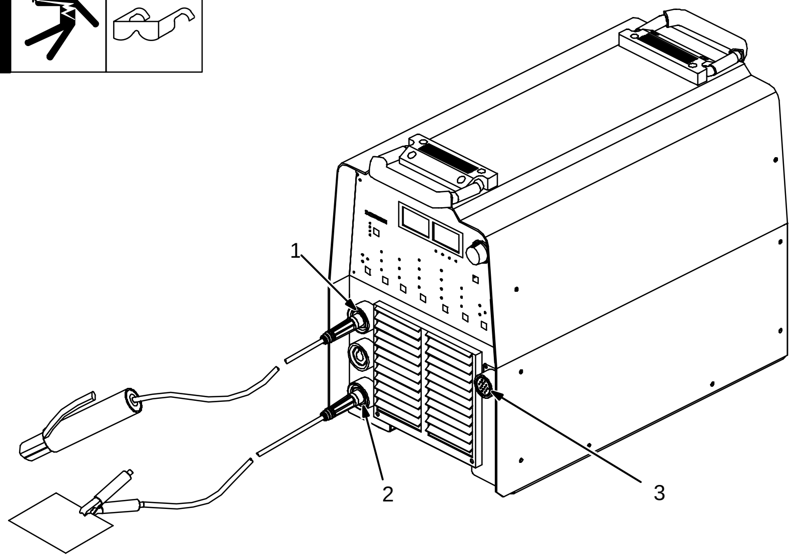
CE Models



ST-198 714

3-13. Stick DCEP (Direct Current Electrode Positive) Connections





1 Negative (–) Weld Output Terminal

Connect work lead to negative weld output terminal.

2 Positive (+) Weld Output Terminal

Connect electrode holder to positive weld output terminal.

3 Remote 14 Receptacle

If desired, connect remote control to Remote 14 receptacle (see Section 3-7).

Ref. ST-802 650-A

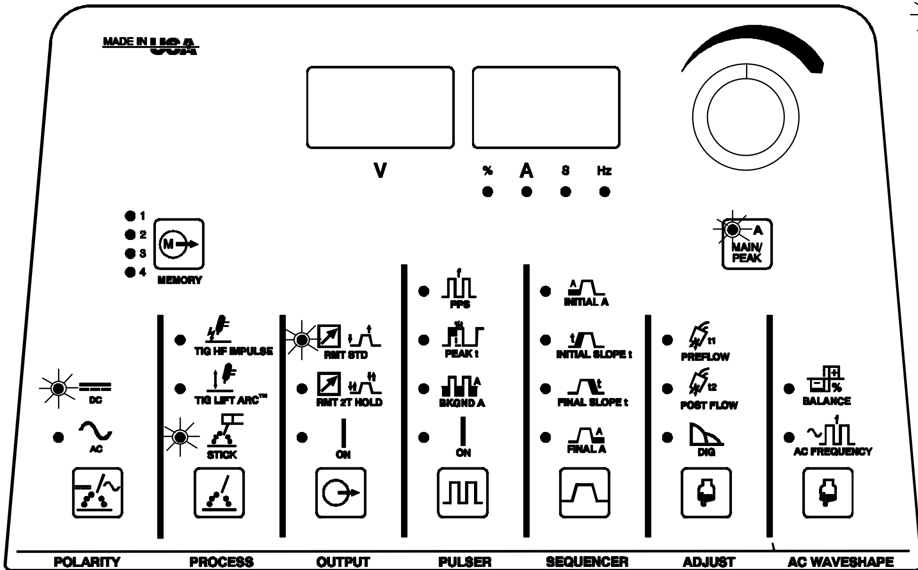
3-14. Front Panel Display For Stick DCEP (Direct Current Electrode Positive)

1 Front Panel

Correct front panel display for basic Stick DCEP welding.

For all front panel switch pad controls: press switch pad to turn on light and enable function.

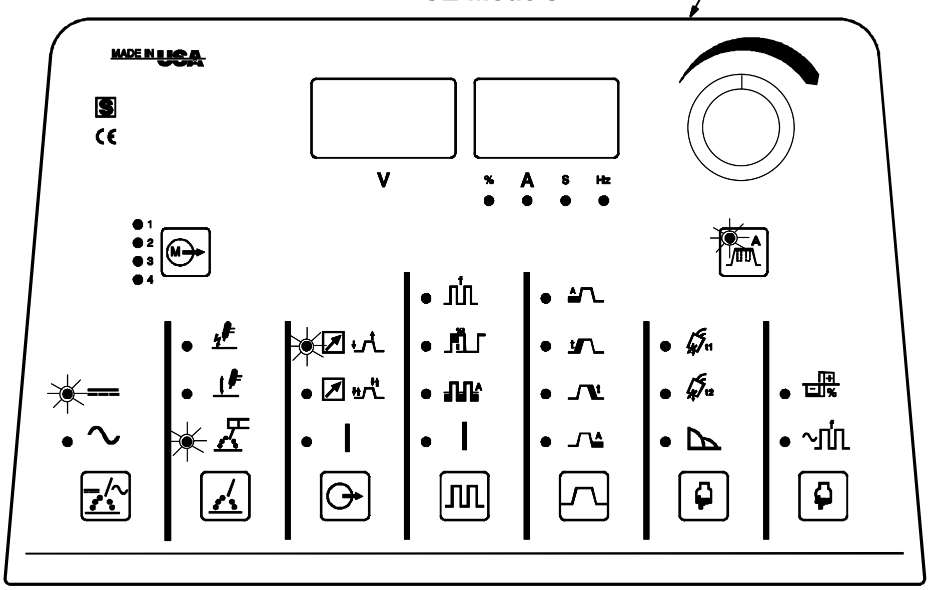
NOTE: Gray on nameplate indicates a Stick function (see Section 4-1 for description of controls).



ST-198 708

1

CE Models



ST-198 714

3-15. Electrical Service Guide

A. For Multivoltage Units

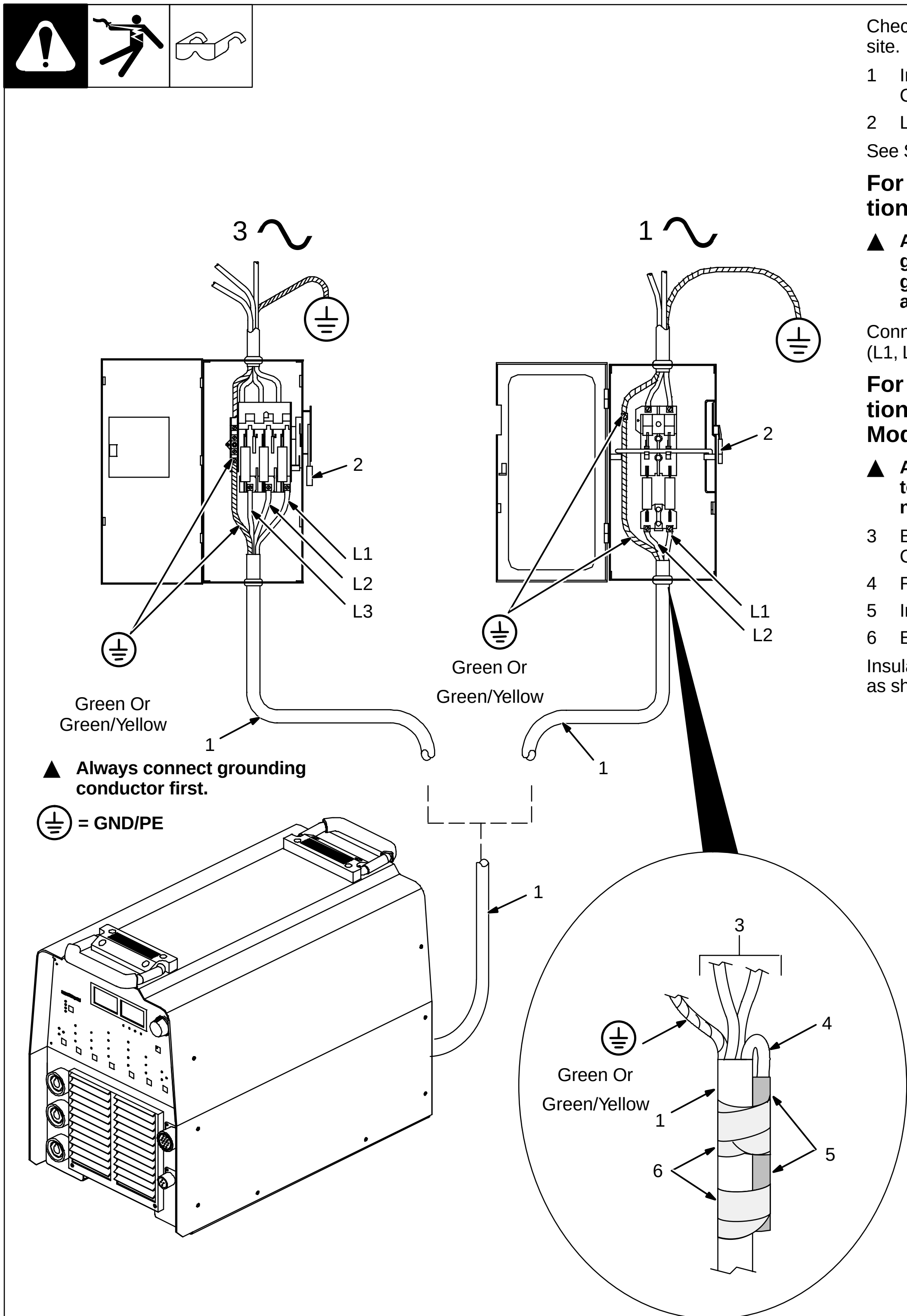
NOTE	*Actual input voltage cannot exceed ± 10% of indicated required input voltage. If actual input voltage is outside of this range, no output is available.*

Input Voltage		Three-Phase		Single-Phase	
		230	460	230	460
Input Amperes At Rated Output	**AC**	26.5	17.9	62.6	32.2
	DC	20.5	13.4	44	25.8
Max Recommended Standard Fuse Or Circuit Breaker Rating In Amperes		50	25	100	50
Min Input Conductor Size In AWG/Kcmil		10	14	8	10
Max Recommended Input Conductor Length In Feet (Meters)		104 (32)	165 (50)	90 (27)	241 (74)
Min Grounding Conductor Size In AWG/Kcmil		10	14	8	10
Reference: 1996 National Electrical Code (NEC).					S-0092J

B. For Single Voltage Units

Input Voltage	400
Input Amperes At Rated Output	20.2
Max Recommended Standard Fuse Or Circuit Breaker Rating In Amperes	30
Min Input Conductor Size In AWG/Kcmil	14
Max Recommended Input Conductor Length In Feet (Meters)	125 (38)
Min Grounding Conductor Size In AWG/Kcmil	14
Reference: 1996 National Electrical Code (NEC).	S-0092J

3-16. Connecting Input Power



input_2 3/96 - ST-802 136-A

Check input voltage available at site.

1 Input And Grounding Conductors

2 Line Disconnect Device

See Section 3-15.

For three-phase operation:

▲ **Always connect green or green/yellow wire to supply grounding terminal, never to a line terminal.**

Connect black, white, and red wires (L1, L2, L3) to line terminals.

For single-phase operation: 208-230/460 Volt Models

▲ **Always connect green wire to supply grounding terminal, never to a line terminal.**

3 Black And White Input Conductor

4 Red Input Conductor

5 Insulation Sleeving

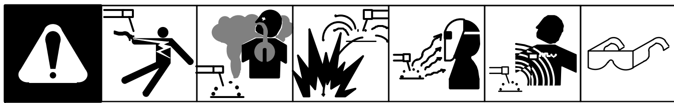
6 Electrical Tape

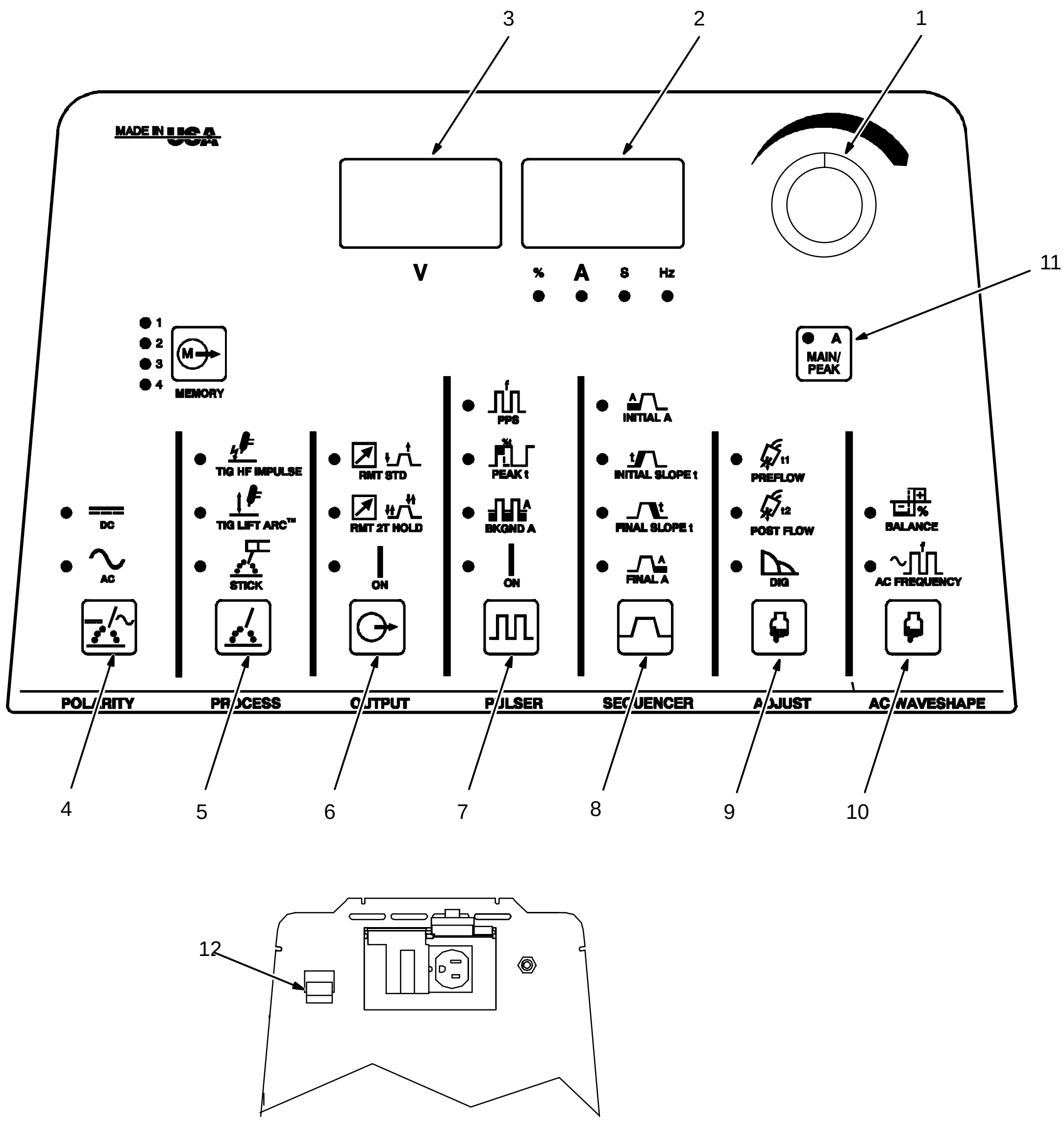
Insulate and isolate red conductor as shown.

SECTION 4 – OPERATION

4-1. Controls

A. Non CE Units (DX/LX Model Shown)





Rear Panel

☞ *For all front panel switch pad controls: press switch pad to turn on light and enable normal function.*

NOTE: Green on nameplate indicates a TIG function, Gray indicates a normal Stick function.

1 Encoder Control

Use encoder control in conjunction with applicable front panel function switch pads to change values for that function. See Section 4-2.

2 Ammeter

See Section 4-3.

3 Voltmeter

See Section 4-3.

4 Polarity Control

See Section 4-4.

5 Process Controls

See Section 4-5.

6 Output Controls

See Section 4-7.

To reconfigure 2T control for use as 4T, 4TE, Mini Logic control, or Spot control see Section 4-14.

7 Pulser Controls (DX And LX Models)

See Section 4-11.

8 Sequencer Controls (DX, LX And All CE Models)

See Section 4-12.

9 Adjust Controls

See Section 4-9.

10 AC Waveshape

See Section 4-10.

11 Amperage Control

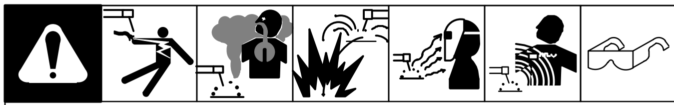
See Section 4-8.

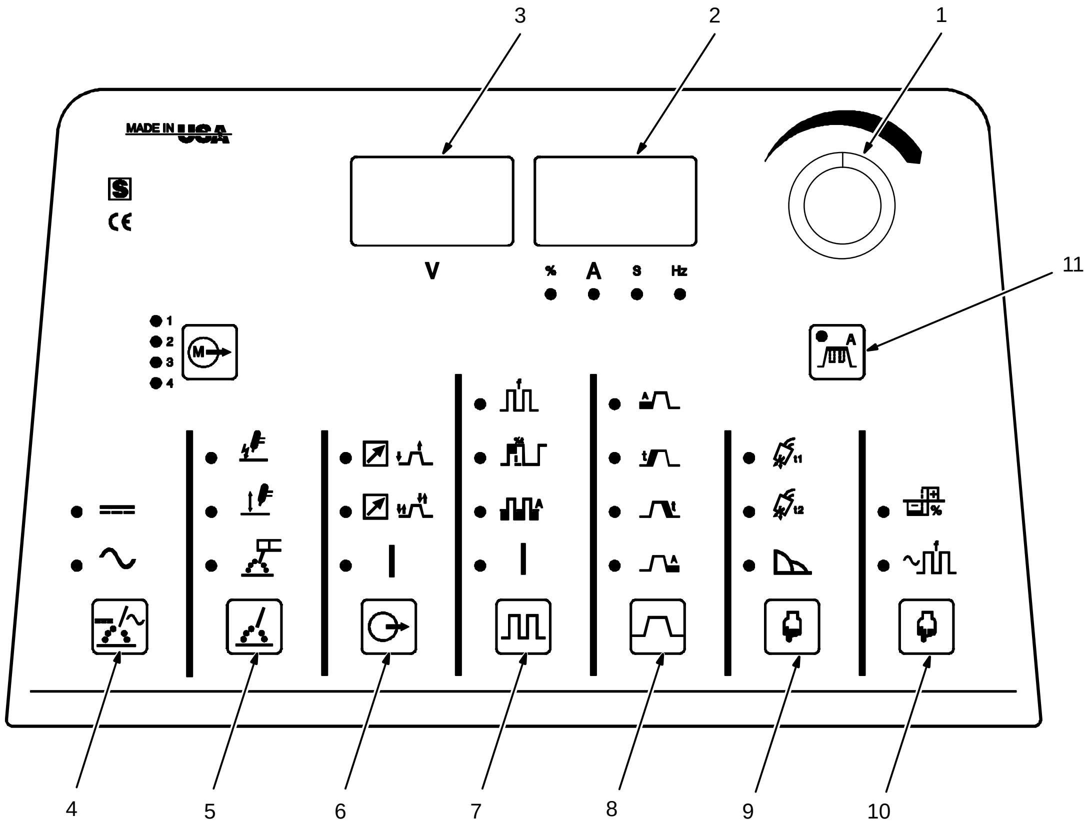
12 Power Switch

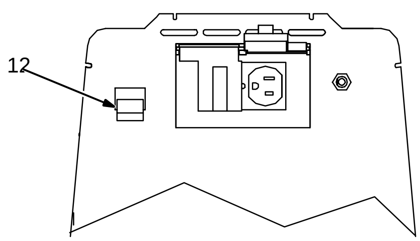
Use switch to turn unit On/Off.

ST-198 708 / ST-802 452

B. For CE Units (DX/LX Model Shown)







Rear Panel

☞ *For all front panel switch pad controls: press switch pad to turn on light and enable normal function.*

NOTE: Green on nameplate indicates a TIG function, Gray indicates a normal Stick function.

1 Encoder Control

Use encoder control in conjunction with applicable front panel function switch pads to change values for that function. See Section 4-2.

2 Ammeter

See Section 4-3.

3 Voltmeter

See Section 4-3.

4 Polarity Control

See Section 4-4.

5 Process Controls

See Section 4-5.

6 Output Controls

See Section 4-7.

To reconfigure 2T control for use as 4T, 4TE, Mini Logic control, or Spot control see Section 4-14.

7 Pulser Controls (DX And LX Models)

See Section 4-11.

8 Sequencer Controls (DX, LX And All CE Models)

See Section 4-12.

9 Adjust Controls

See Section 4-9.

10 AC Waveshape

See Section 4-10.

11 Amperage Control

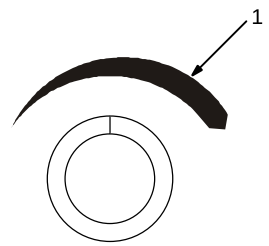
See Section 4-8.

12 Power Switch

Use switch to turn unit On/Off.

ST-198 714 / ST-802 452

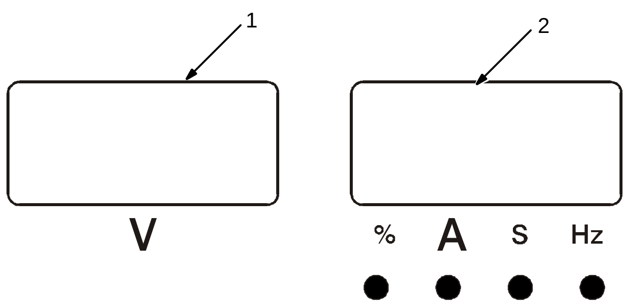
4-2. Encoder Control



1 Encoder Control

Use control in conjunction with applicable front panel function switch pad to set values for that function.

4-3. Ammeter And Volt Meter



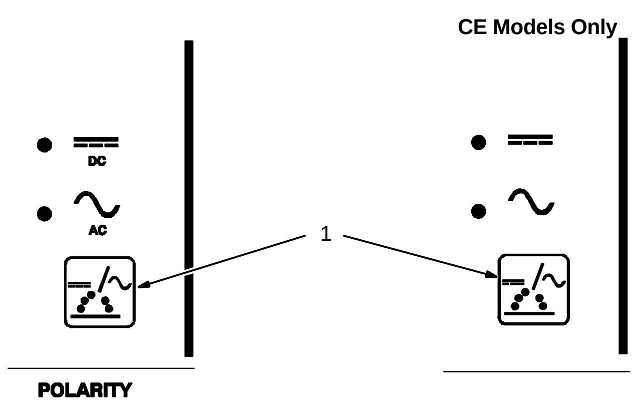
V 1 Volt Meter

Displays output or open circuit voltage. If output is off, the voltmeter will display a series of three dashes (-—). Open circuit voltage is displayed if power is on and output is available.

A 2 Ammeter

% A S Hz Displays actual amperage while welding. Meter also displays preset parameters for any of the following units of measure when they are active: amperage, time, percentage or frequency. The corresponding LED, located directly below the ammeter, will also illuminate.

4-4. Polarity Control



1 Polarity Control

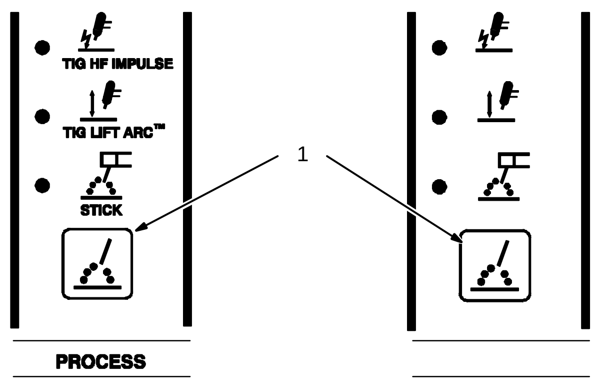
Press switch pad until desired LED is illuminated.

DC - Machine is set to DCEN (direct current electrode negative) for TIG welding, and to DCEP (direct current electrode positive) for Stick welding.

AC - Use AC (alternating current) for TIG and Stick welding.

4-5. Process Control

CE Models Only



1 Process Control

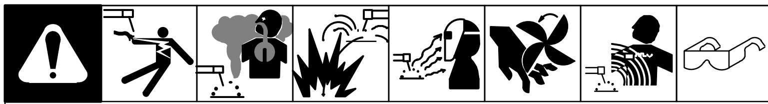
Press switch pad until desired process LED is illuminated:

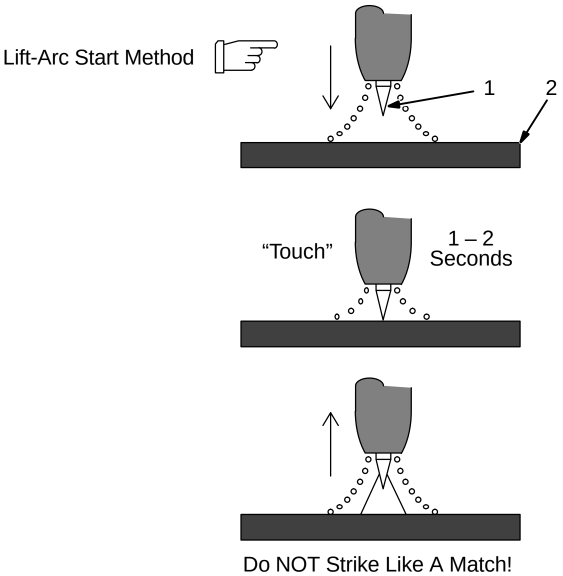
TIG HF Impulse - When selected, a pulsed HF (non-contact) (see Section 4-6) arc starting method is activated. This method can be used with either AC or DC TIG welding. Make connections according to Section 3-11.

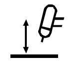
TIG Lift-Arc™ - When selected, is an arc starting method in which the electrode must come in contact with the workpiece to initiate an arc (see Section 4-6). This method can be used with either AC or DC TIG welding. Make connections according to Section 3-11.

Stick (SMAW) - When selected, Adaptive Hot Start And DIG are enabled. This method can be used with either AC or DC Stick welding. Make connections according to Section 3-13.

4-6. Lift-Arc™ And HF TIG Start Procedures







Lift-Arc Start

When Lift-Arc™ button light is On, start arc as follows:

1 TIG Electrode

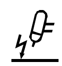
2 Workpiece

Touch tungsten electrode to workpiece at weld start point, enable output with torch trigger, foot control, or hand control. **Hold electrode to workpiece for 1-2 seconds**, and slowly lift electrode. Shielding gas begins to flow when electrode touches workpiece and arc is formed when electrode is lifted.

Normal open-circuit voltage is not present before tungsten electrode touches workpiece; only a low sensing voltage is present between electrode and workpiece. The solid-state output contactor does not energize until after electrode is touching workpiece. This allows electrode to touch workpiece without overheating, sticking, or getting contaminated.

Application:

Lift-Arc is used for the DCEN or AC GTAW process when HF Start method is not permitted, or to replace the scratch method.



HF Start

When HF Start button light is On, start arc as follows:

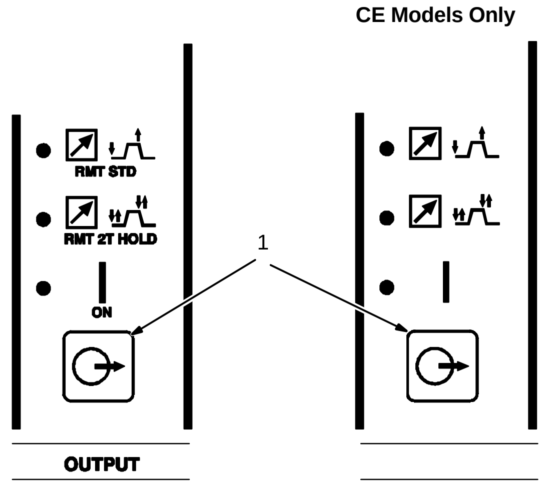
High frequency turns on to help start arc when output is enabled. High frequency turns off when arc is started, and turns on whenever arc is broken to help restart arc.

Application:

HF start is used for the DCEN GTAW process when a non-contact arc starting method is required.

Notes

4-7. Output Control



1 Output Control

Press switch pad until desired parameter LED is illuminated.

RMT STD (Remote Standard)

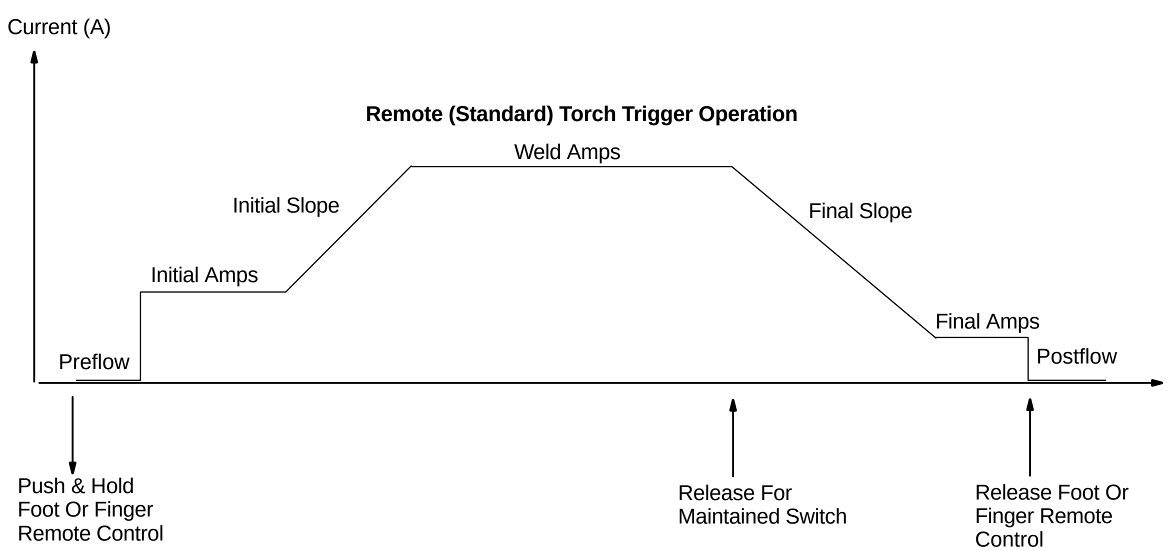
Torch trigger operation is as shown.

NOTE: When a foot or finger remote control is connected to the welding power source, initial amps, initial slope, final slope, and final amps are not functional.

NOTE: If a foot or finger control is connected, initial weld amperage, initial slope, final amperage, and final slope is controlled by the remote device, not by the welding power source.

NOTE: If On/Off only type trigger is used, it must be a maintained switch. All functions become active, and must be set by the operator.

Application: Use Remote Trigger when the operator desires to use a foot pedal or finger amperage control.



NOTE: If arc is broken and trigger is depressed, HLP-10 will be displayed (see Section 5-3).

1 Output Control

Press switch pad until desired parameter LED is illuminated.

RMT 2T Hold

Press switch pad to activate function.

Torch trigger operation is as shown.

NOTE: If a foot or finger remote control is connected to the welding power source, only trigger input is functional.

NOTE: Amperage is controlled by the welding power source.

NOTE: Switch function can be reconfigured for 4T, 4TE, Mini Logic, or Spot control (see Section 4-14).

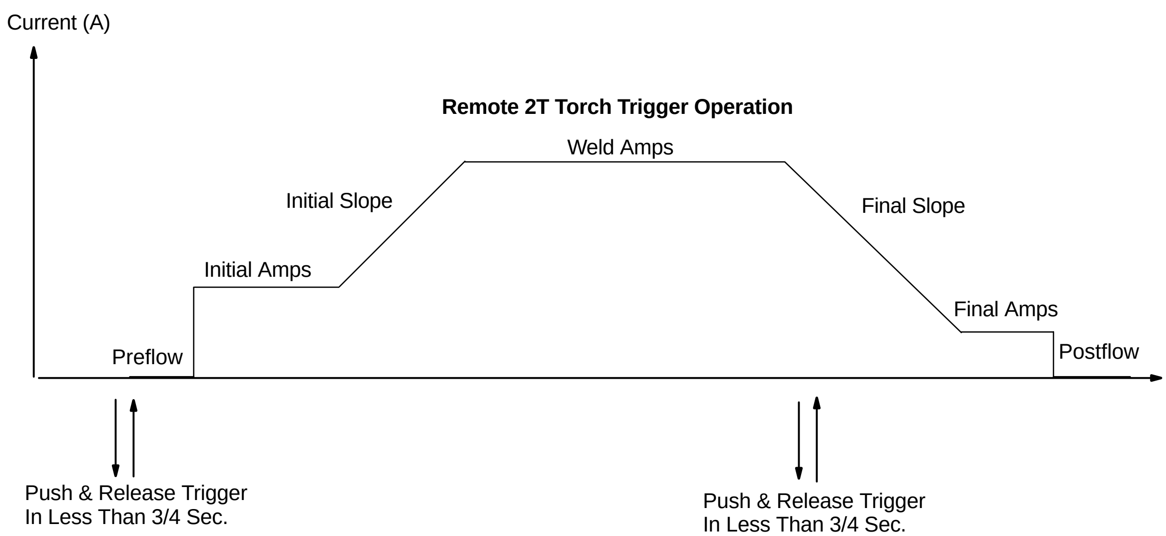
Application: Use Remote Trigger Hold (2T) when long extended welds are made. Remote Trigger Hold (2T) can help to reduce operator fatigue.

ON

Press switch pad to activate function. Output will be available when LED is illuminated.

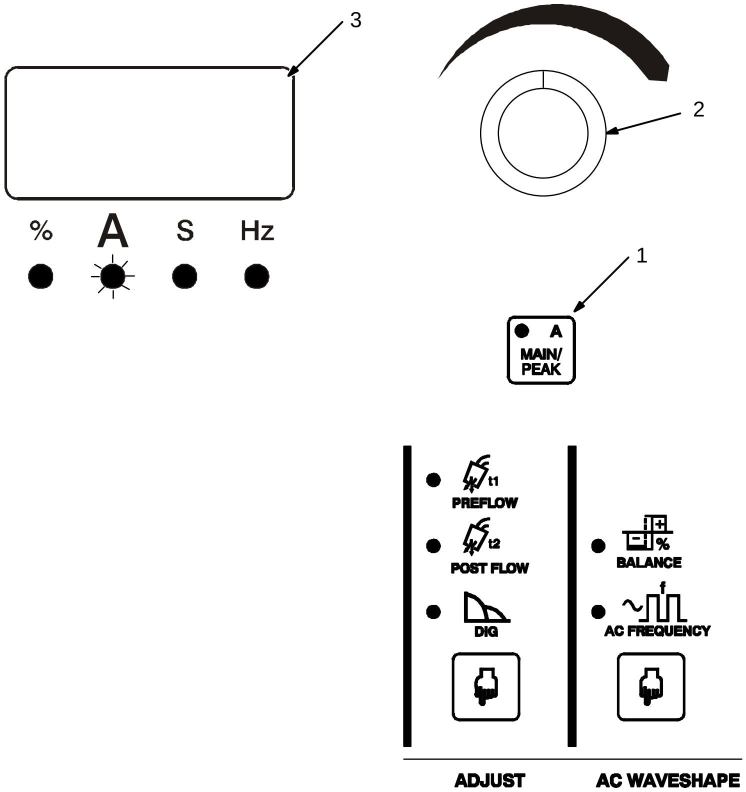
NOTE: A remote contactor control is not required.

Application: Use Output On for Stick (SMAW) welding, or for Lift-Arc without the use of a remote control.

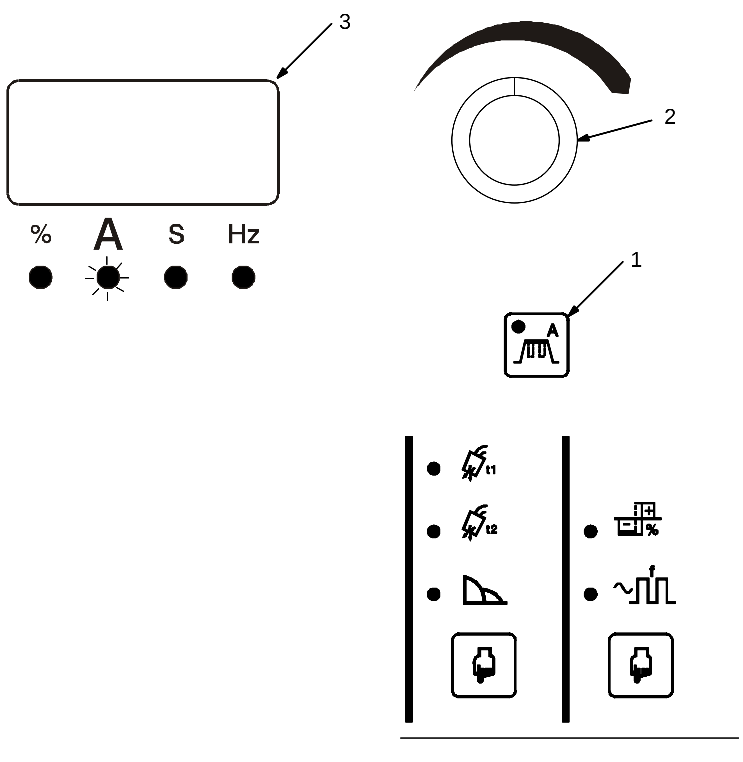


NOTE: If torch trigger is held more than 3 seconds, operation reverts to Remote Trigger (Standard) mode. If arc is broken and trigger is depressed, HLP-10 will be displayed (see Section 5-3).

4-8. Amperage Control



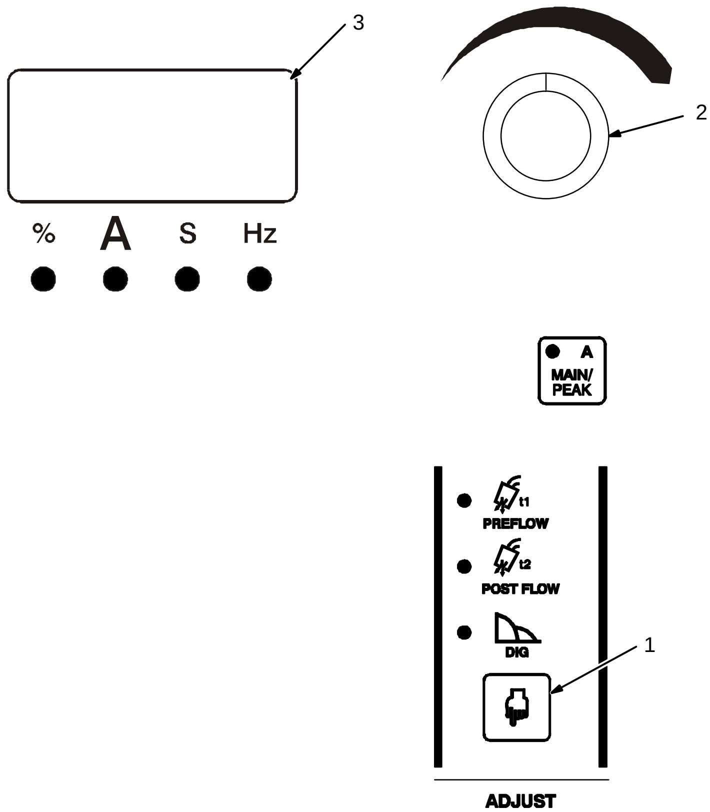
CE Models Only



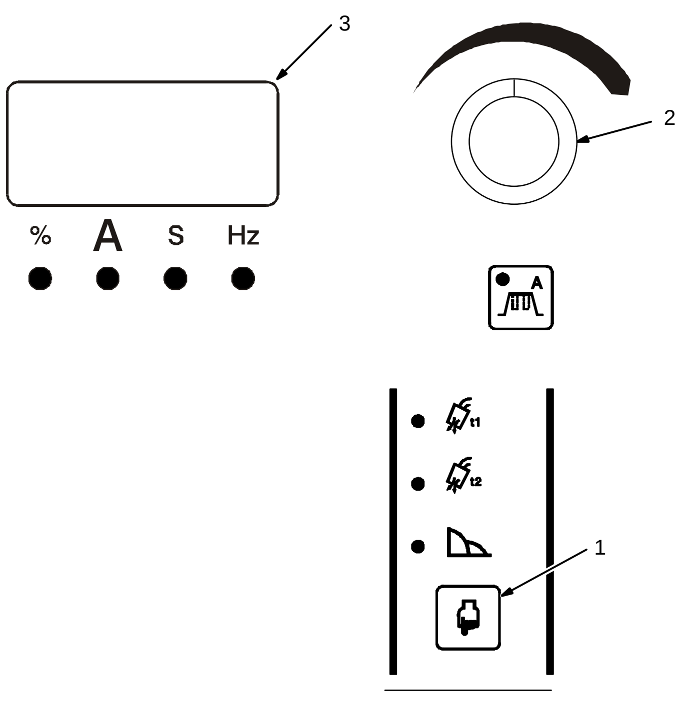
1 A (Amperage Control)
2 Encoder Control
3 Ammeter

Press Amperage switch pad, and turn Encoder control to set weld amperage (5-300 amps). Weld amperage setting is also peak amperage when Pulser function is active (see Section 4-11). Amperage selected is displayed on ammeter (see Section 4-3) and the ammeter A LED will be illuminated.

4-9. Adjust Controls (Post Flow/DIG)



CE Models Only



1 Preflow/Post Flow/DIG Control

Press switch pad until desired function LED is illuminated.

2 Encoder Control

3 Ammeter

Preflow - If the TIG process is active (see Section 4-5), press switch pad and turn encoder control to set length of time (0–15 seconds) gas flows before arc initiation.

Application: Preflow is used to purge the immediate weld area of atmosphere. Preflow also aids in consistent arc starts.

Post Flow - This switch activates a process specific function. If the TIG process is active (see Section 4-5), press switch pad and turn encoder control to set length of time (0–50 seconds) gas flows after welding stops. Time selected is displayed on ammeter (see Section 4-3) and the ammeter S LED will be illuminated.

Application:

Postflow is required to cool tungsten and weld, and to prevent contamination of tungsten and weld. Increase postflow time if tungsten or weld are dark in appearance.

DIG - If the Stick process is active (see Section 4-5), press switch pad and turn encoder control to set amount of DIG (0-100%). When set at 0, short-circuit amperage at low arc voltage is the same as normal welding amperage.

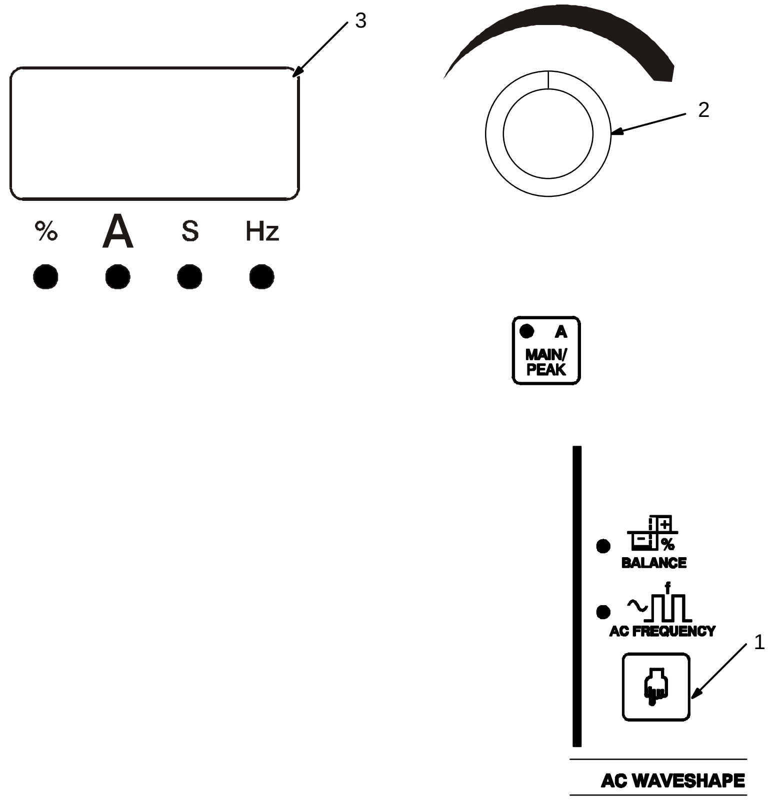
When setting is increased, short-circuit amperage at low arc voltage increases.

Percentage selected is displayed on ammeter (see Section 4-3) and the ammeter % LED will be illuminated.

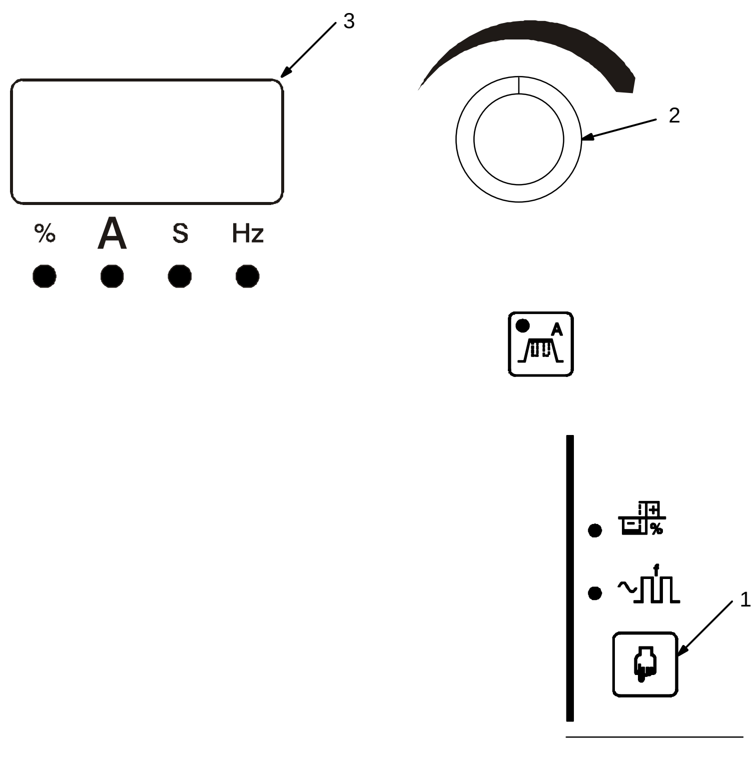
Application:

Control helps arc starting or making vertical or overhead welds by increasing amperage at low arc voltage, and reduces electrode sticking while welding.

4-10. AC Wave Shape



CE Models Only



1 Balance And AC Frequency Control

2 Encoder Control

3 Ammeter

Balance: Press switch pad and turn Encoder Control to set percentage of time, 50–90%, polarity is electrode negative. AC Balance Control is enabled only if AC TIG process is selected.

Application:

When welding on oxide forming materials such as aluminum or magnesium, excess cleaning is not necessary. To produce a good weld, only a minimal amount, approximately a 0.10 in (2.5mm) of etched zone along the weld toes is required.

Joint configuration, set-up, process variables, and oxide thickness may affect setting.

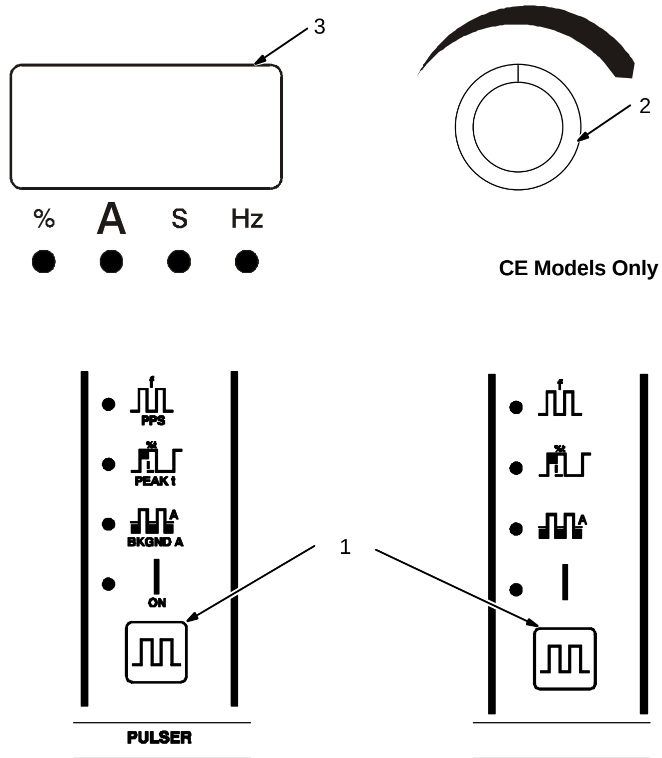
Arc rectification can occur when welding above 200 amps and/or while welding with helium gas. If this condition occurs, increasing the Balance control towards maximum penetration, may help to restabilize the arc.

AC Frequency: Press switch pad and turn Encoder Control to set AC frequency from 20–250 Hz (cycles per second). AC Frequency Control is enabled only if AC TIG process is selected.

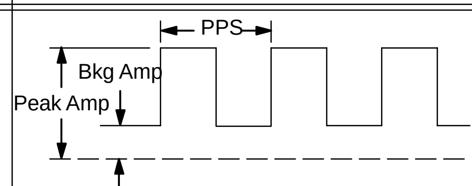
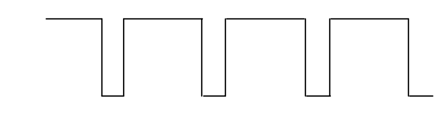
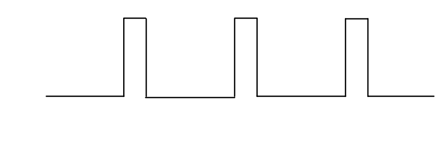
Application:

AC frequency controls bead width and directional control. As AC frequency decreases, weld bead/puddle gets wider. As AC frequency increases, weld bead/puddle becomes narrower and the arc becomes more focused. Travel speed can increase as AC frequency increases.

4-11. Pulser Control (DX And LX Models)



4

Percent (%) Peak Time Control Setting		Pulsed Output Waveforms
Balanced	(50%)	
More Time At Peak Amperage	(80%)	
More Time At Background Amperage	(20%)	

1 Pulser Control

Press switch pad to enable pulser.

Press switch pad until desired parameter LED is illuminated. Pulsing is available only while using the TIG process, it cannot be selected if the Stick process (see Section 4-5) is active. Controls can be adjusted while welding.

2 Encoder Control

3 Ammeter

Turn encoder (see Section 4-2) to select appropriate value for active pulse parameter. Value selected is shown on the ammeter (see Section 4-3). Also, the ammeter LED for the corresponding unit of measure (%, A, s, Hz) of the active parameter will be illuminated.

Pulser parameters are as follows:

On - When illuminated, this LED indicates the pulser is on.

PPS (Pulse Frequency) - Ranges from .1–500 pps (pulses per second). Control is used to determine appearance of weld bead.

Peak Time - A range of 5–95% of each pulse cycle can be spent at the peak amperage level.

BKGND A (Background Amps) - Use Background Amps control to set the low pulse of the weld amperage, which cools the weld puddle and affects overall heat input. Background Amps is set as a percentage (5-95%) of peak amperage.

4 Pulsed Output Waveforms

Example shows affect changing the Peak Time control has on the pulsed output waveform.

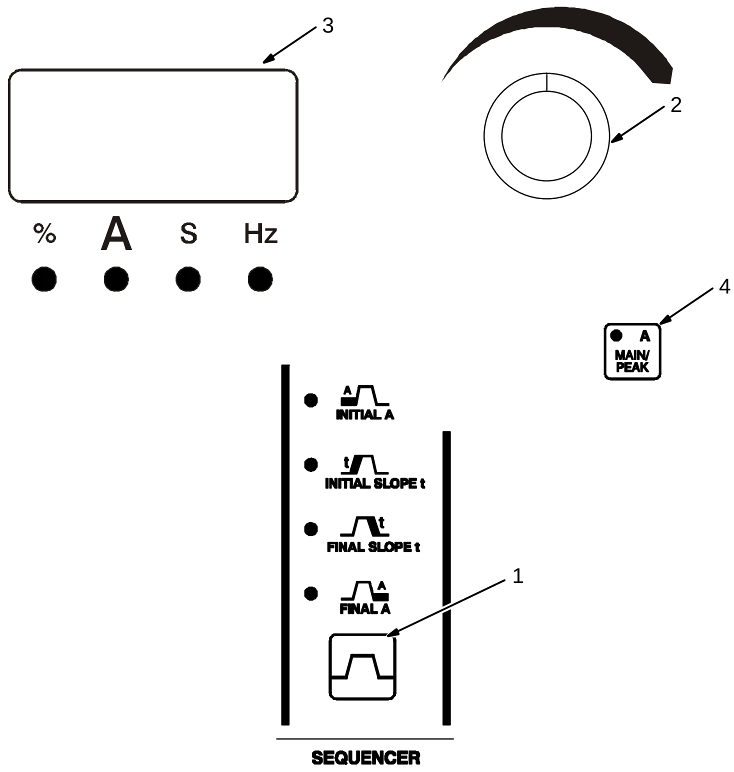
NOTE: Peak amperage is set using the Amperage control (see Section 4-8). Peak amperage (5–300 amps) is the highest welding amperage allowed to occur in the pulse cycle. Weld penetration varies directly with peak amperage.

Application:

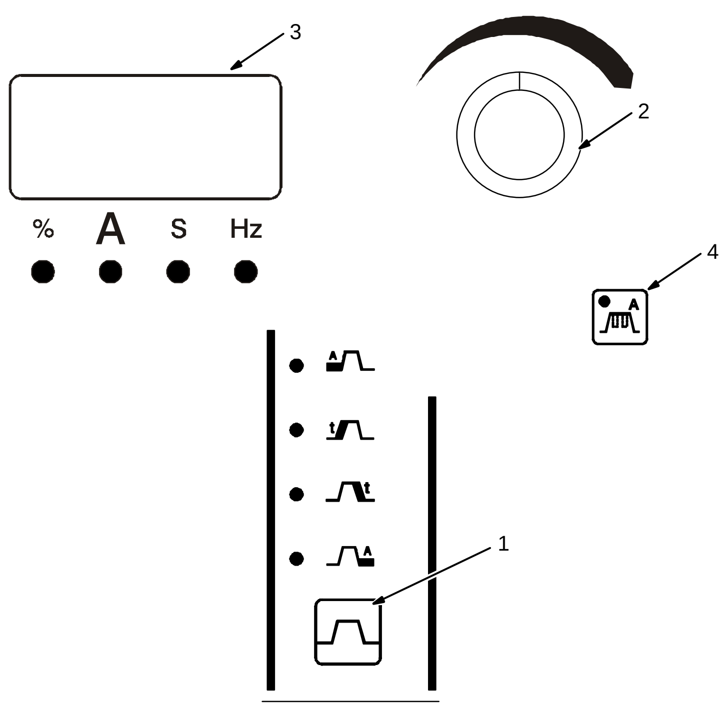
Pulsing refers to the alternating raising and lowering of the weld output at a specific rate. The raised portions of the weld output are controlled in width, height, and frequency, forming pulses of weld output. These pulses and the lower amperage level between them (called the background amperage) alternately heat and cool the molten weld puddle. The combined effect gives the operator better control of penetration, bead width, crowning, undercutting, and heat input. Controls can be adjusted while welding.

Pulsing can also be used for filler material addition technique training.

4-12. Sequencer Controls (DX, LX And All CE Models)



CE Models Only



1 Sequencer Control

Press switch pad until desired parameter LED is illuminated. Sequencing is available only while using the TIG process, but is disabled if a remote foot or finger control is connected to the Remote receptacle (see Section 3-7). Sequencer parameters cannot be selected if the Stick process (see Section 4-5) is active.

2 Encoder Control

3 Ammeter

Turn encoder (see Section 4-2) to set appropriate value for active sequence parameter. Value selected is shown on the ammeter (see Section 4-3). Also, the ammeter LED for the corresponding unit of measure (A, s) of the active parameter will be illuminated.

4 Amperage Control

Weld Time (LX Models Only) - Press Amperage switch pad twice. Set weld time from 0 to 999 seconds.

The Sequencer parameters are as follows:

Initial A (Initial Amperage) - Use control to select a starting amperage (1–300 amps) that is different from the weld amperage.

Application:

Initial Amperage can be used while GTAW welding to assist in preheating cold material prior to depositing filler material, or to ensure a soft start.

Initial t (Initial Time)**(LX Models Only) -** Press control again to select 0-25 seconds of time that is needed at the beginning of the weld.

Initial Slope t (Initial Slope Time) Use control to select 0-25 seconds of time that it takes to slope up/down from initial amperage to weld amperage. To disable, set to 0.

Final Slope t (Final Slope Time) - Use control to select 0-25 seconds of time that it takes to slope up/down from weld amperage to final amperage. To disable, set to 0.

Application:

Final Slope should be used while GTAW welding materials that are crack sensitive, and/or the operator wants to eliminate the crater at the end of the weld.

Final A (Final Amperage) - Final amperage (1-300 amps) is the amperage to which weld amperage has sloped up/down to.

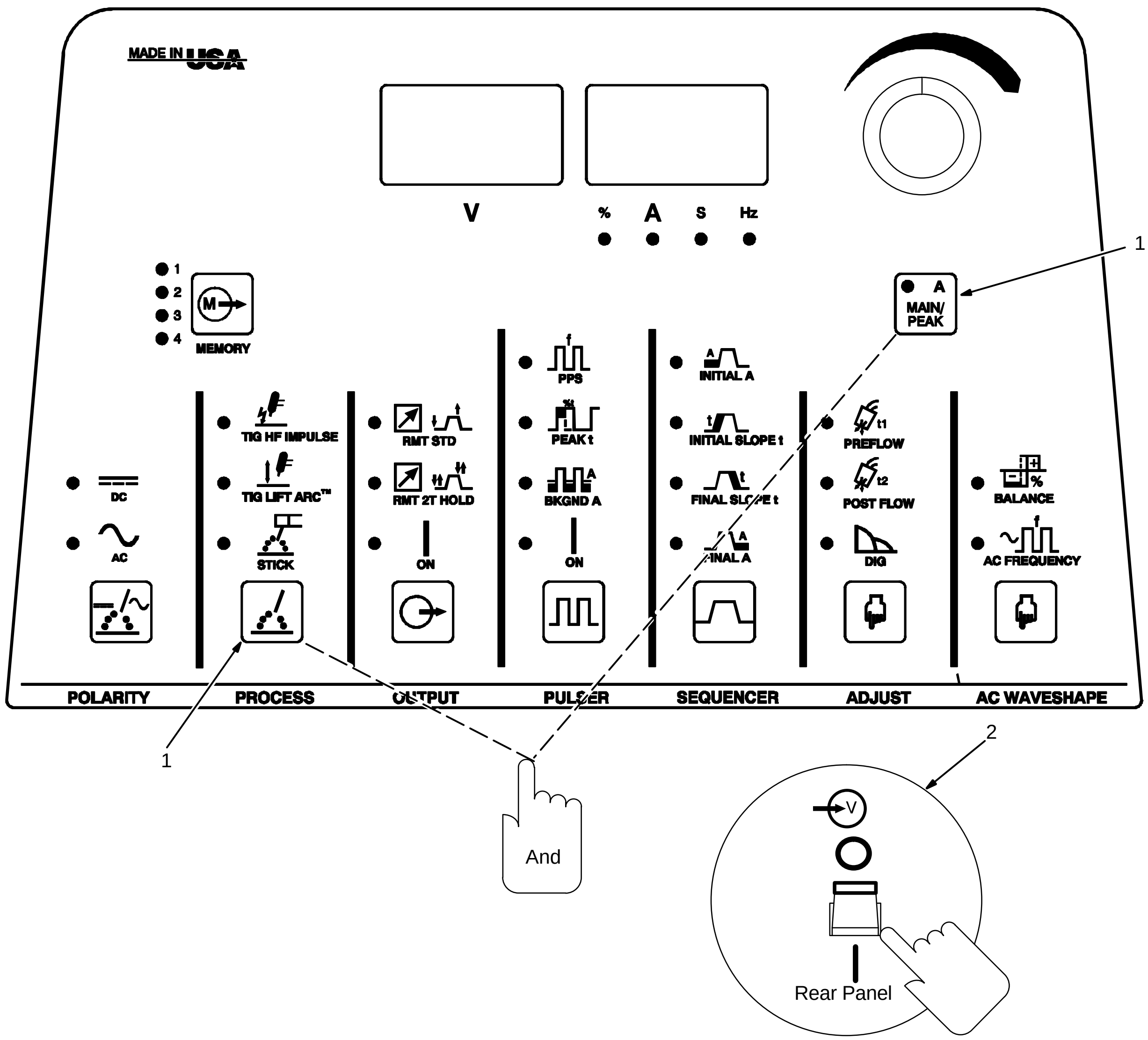
Final t (Final Time)**(LX Models Only)** - Press control again to select 0-25 seconds of time that is needed at the end of the weld.

Notes

4-13. Programmable TIG HF Impulse Start Polarity, Amperage And Time Modes

A. Accessing Programmable TIG Start Polarity, Amperage And Time Modes (All Models)

Non CE Models Only



NOTE: Before accessing programmable TIG HF Impulse Start Amperage and Time modes, be sure that all procedures and parameters are established. Especially, check for proper amperage setting (see Section 4-8). Parameter adjustment is limited while programmable TIG HF Impulse start amperage and time modes are active.

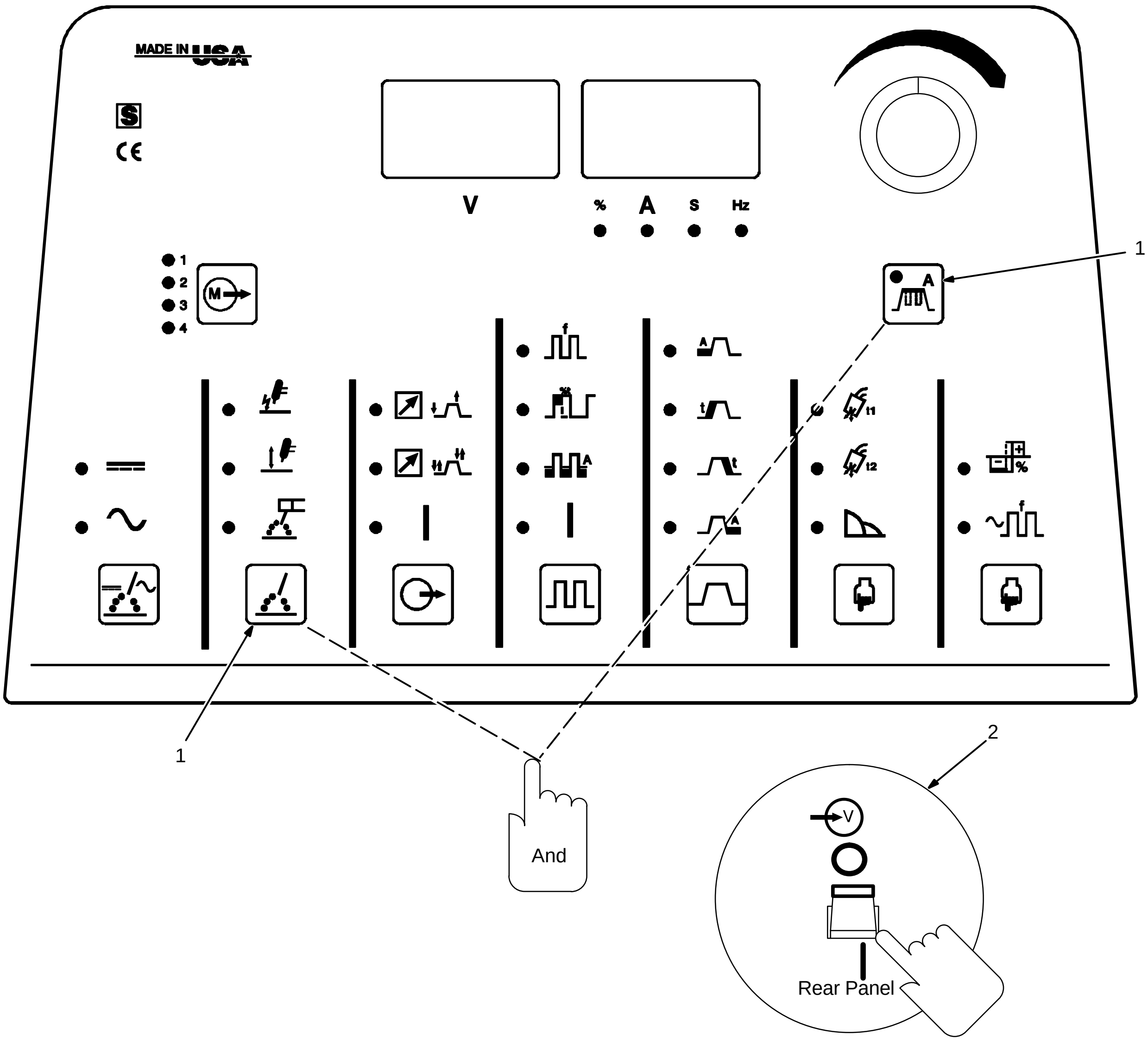
1 Process And Amperage Key Pads

2 Power Switch

To display the programmable TIG HF Impulse Start Amperage and Time screens, turn power Off. Push and hold Process and Amperage switch pads and turn On power switch. Hold switch pads for approximately 7 seconds (or until software version number _ _ _ _ _ _-_clears meters).

Proceed to Section B, C and/or D.

CE Models Only



NOTE: Before accessing programmable TIG HF Impulse Start Amperage and Time modes, be sure that all procedures and parameters are established. Especially, check for proper amperage setting (see Section 4-8). Parameter adjustment is limited while programmable TIG HF Impulse start amperage and time modes are active.

1 Process And Amperage Key Pads

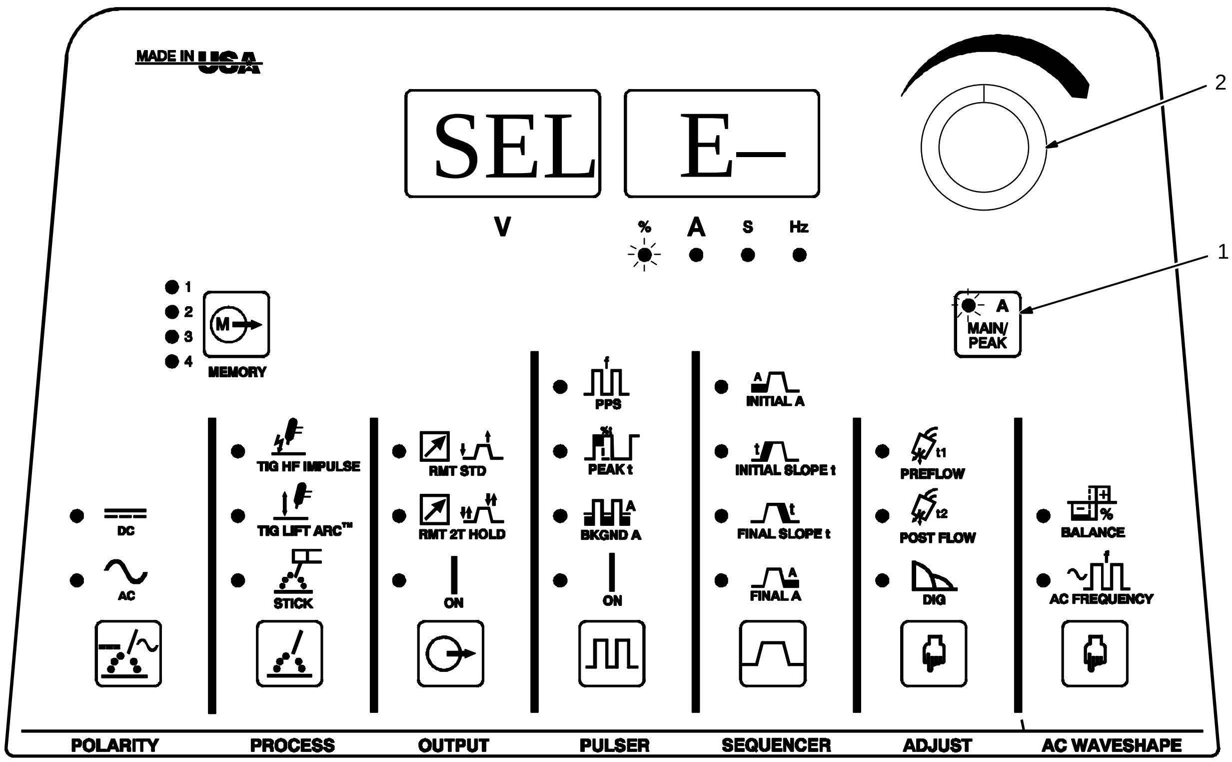
2 Power Switch

To display the programmable TIG HF Impulse Start Amperage and Time screens, turn Off power. Push and hold Process and Amperage switch pads and turn On power switch. Hold switch pads for approximately 7 seconds (or until software version number _ _ _ _ _ _-_clears meters).

Proceed to Section B, C and/or D.

B. Setting Programmable TIG Impulse Start Polarity (All Models)

Non CE Models Only



NOTE: Before accessing programmable TIG HF Impulse Start Amperage mode, be sure that all procedures and parameters are established. Especially, check for proper amperage setting (see Section 4-8). Parameter adjustment is limited while programmable TIG Impulse Start Amperage mode is active.

Welding cycle can be executed while in programmable start mode, but program parameters cannot be adjusted while in this mode.

A 1 Amperage Switch Pad

⌒ 2 Encoder Control

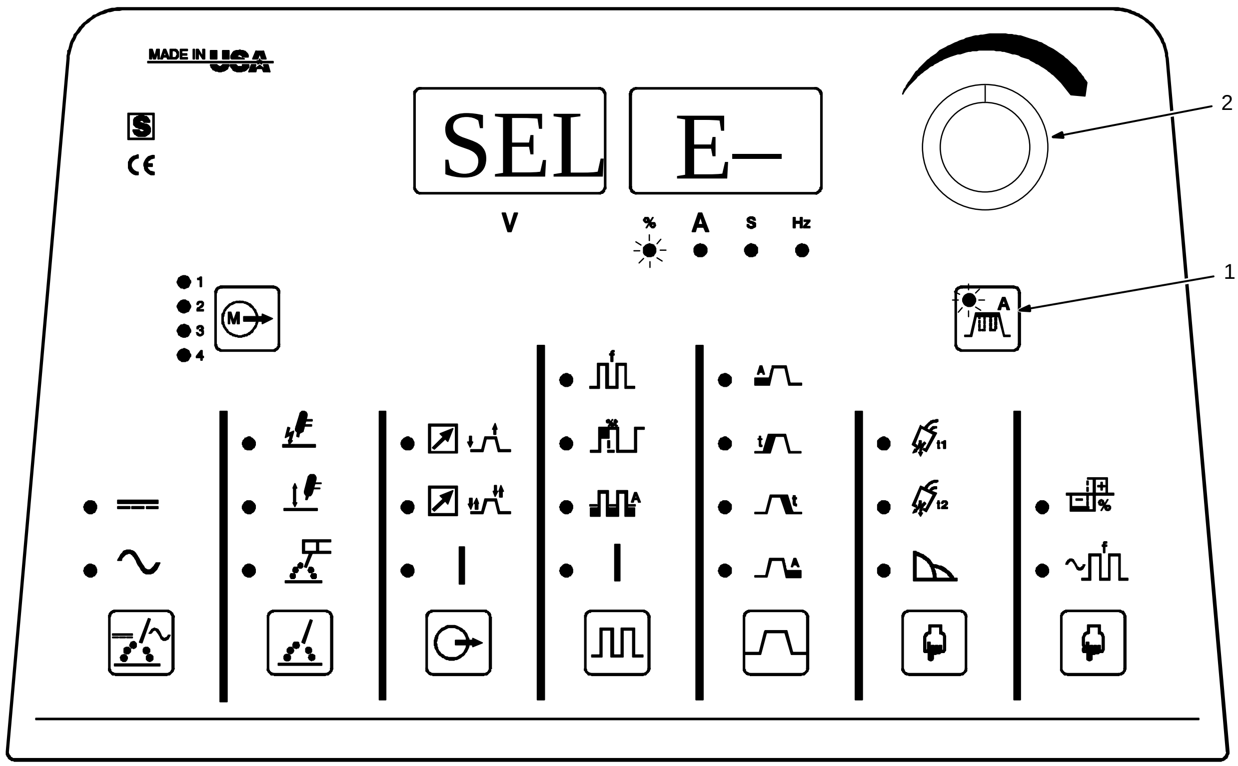
To adjust TIG HF Impulse Start Polarity proceed as follows:

Press Amperage switch pad. Switch pad LED turns on, meter % LED turns on, and [SEL] [E–] is displayed on meters. TIG HF Impulse LED is on. Note: If a remote mode and pulser functions are active, their respective LEDs will be illuminated.

The [E–] displayed on the amps meter is the start polarity. It is also the factory default setting, and can be adjusted from [E–] to [EP] amps by turning the Encoder control.

To change start amperage, proceed to Section C. To save changes to TIG HF Impulse Start Polarity without changing start time or amperage, turn power Off.

CE Models Only



NOTE: Before accessing programmable TIG HF Impulse Start Amperage mode, be sure that all procedures and parameters are established. Especially, check for proper amperage setting (see Section 4-8). Parameter adjustment is limited while programmable TIG Impulse Start Amperage mode is active.

Welding cycle can be executed while in programmable start mode, but program parameters cannot be adjusted while in this mode.

1 Amperage Switch Pad

2 Encoder Control

To adjust TIG HF Impulse Start Polarity proceed as follows:

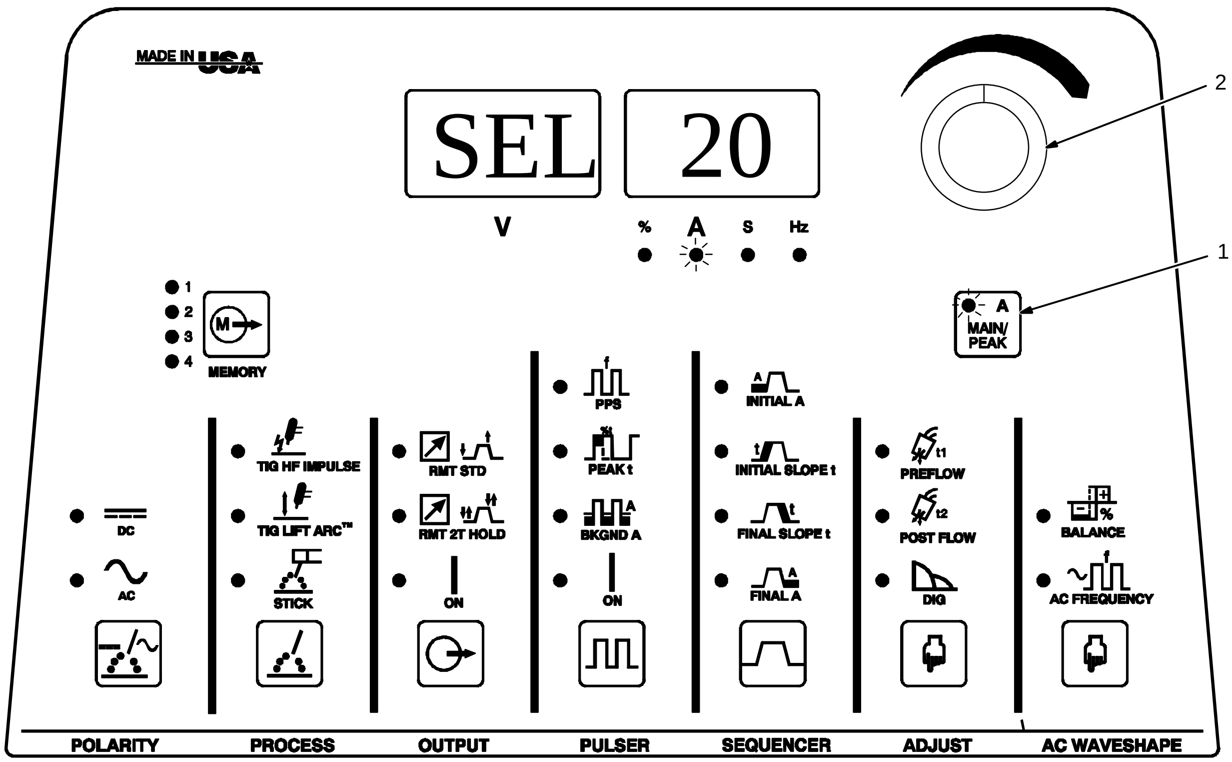
Press Amperage switch pad. Switch pad LED turns on, meter % LED turns on, and [SEL] [E–] is displayed on meters. TIG HF Impulse LED is on. Note: If a remote mode and pulser functions are active, their respective LEDs will be illuminated.

The [E–] displayed on the amps meter is the start polarity. It is also the factory default setting, and can be adjusted from [E–] to [EP] amps by turning the Encoder control.

To change start amperage, proceed to Section C. To save changes to TIG HF Impulse Start Polarity without changing start time or amperage, turn power Off.

C. Setting Programmable TIG Impulse Start Amperage (All Models)

Non CE Models Only



NOTE: Before accessing programmable TIG HF Impulse Start Amperage mode, be sure that all procedures and parameters are established. Especially, check for proper amperage setting (see Section 4-8). Parameter adjustment is limited while programmable TIG Impulse Start Amperage mode is active.

Welding cycle can be executed while in programmable start mode, but program parameters cannot be adjusted while in this mode.

A 1 Amperage Switch Pad

2 Encoder Control

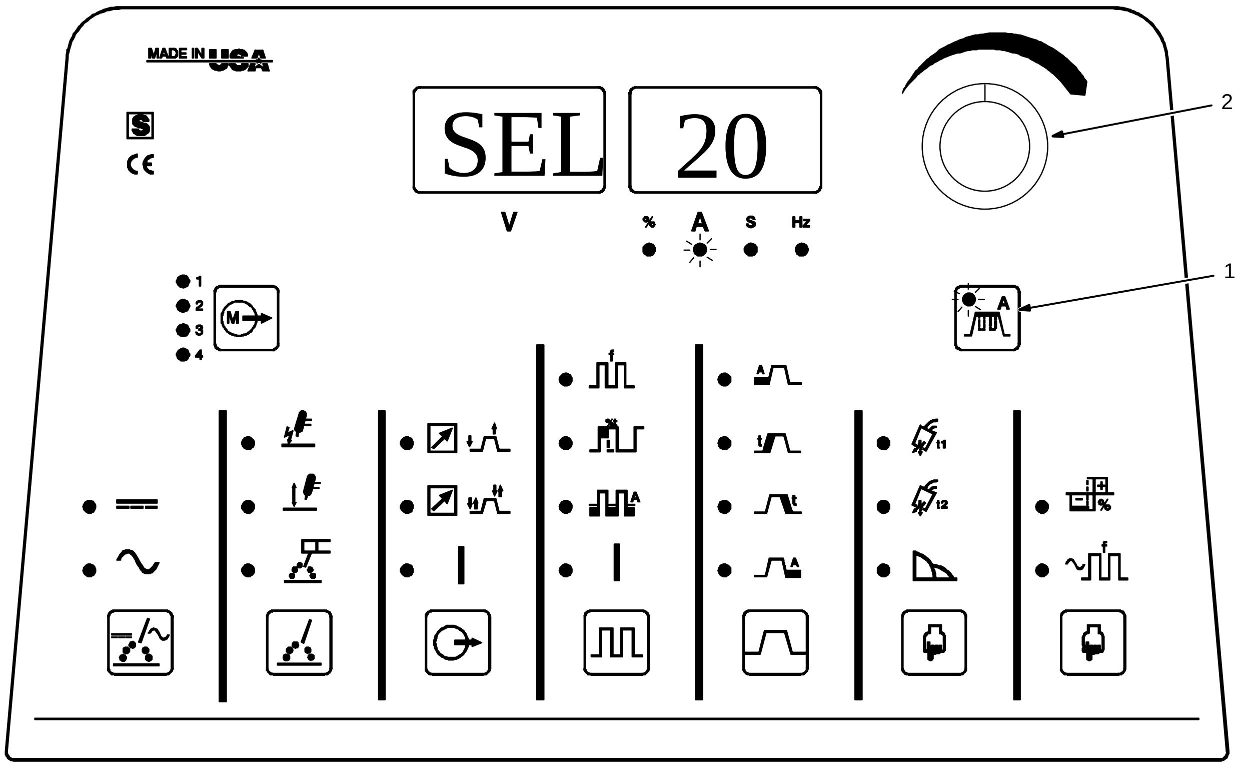
To adjust TIG HF Impulse Start Polarity proceed as follows:

Press Amperage switch pad. Switch pad LED turns on, meter A LED turns on, and [SEL] [20] is displayed on meters. TIG HF Impulse LED is on. Note: If a remote mode and pulser functions are active, their respective LEDs will be illuminated.

The [20] displayed on the amps meter is AC start amps (it is also the factory default setting – [30] for DC start amps), and can be adjusted from 1 to 200 amps by turning the Encoder control.

To change start amps, proceed to Section D. To save changes to TIG HF Impulse Start Amperage without changing start time, turn power Off.

CE Models Only



NOTE: Before accessing programmable TIG HF Impulse Start Amperage mode, be sure that all procedures and parameters are established. Especially, check for proper amperage setting (see Section 4-8). Parameter adjustment is limited while programmable TIG Impulse Start Amperage mode is active.

Welding cycle can be executed while in programmable start mode, but program parameters cannot be adjusted while in this mode.

1 Amperage Switch Pad

2 Encoder Control

To adjust TIG HF Impulse Start Polarity proceed as follows:

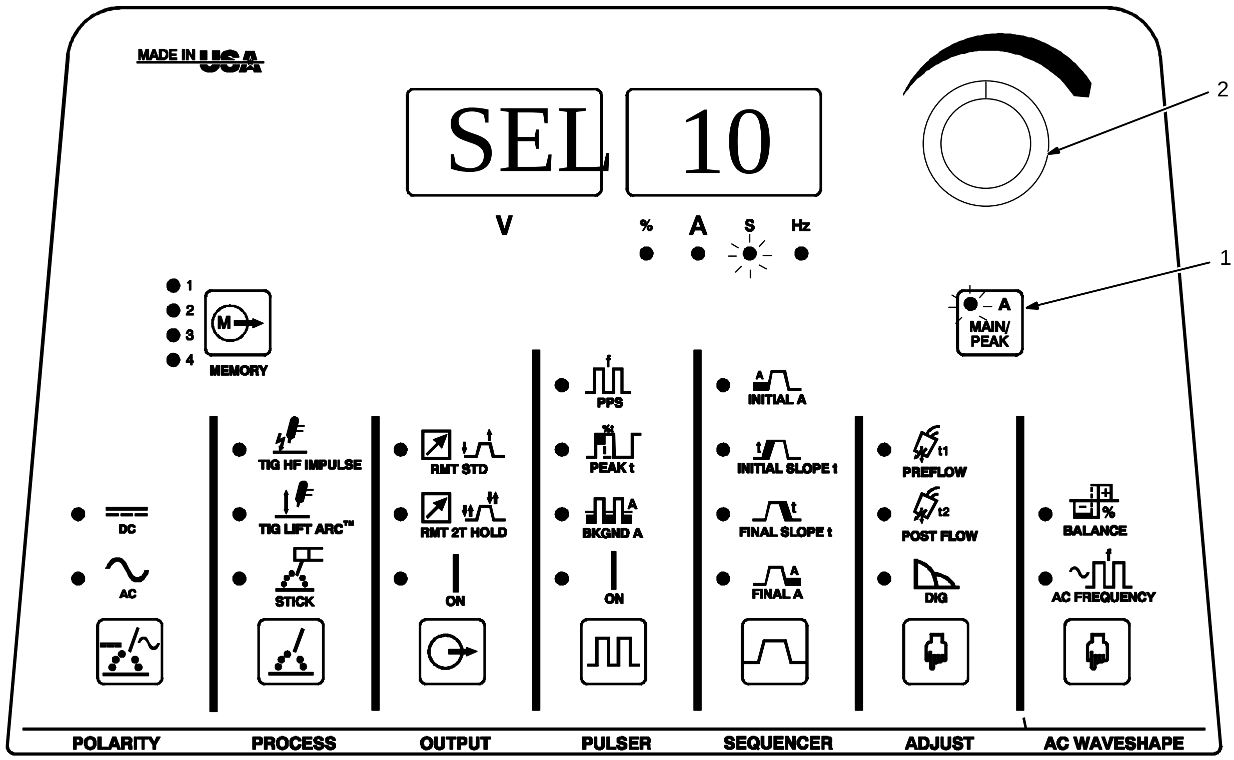
Press Amperage switch pad. Switch pad LED turns on, meter A LED turns on, and [SEL] [20] is displayed on meters. TIG HF Impulse LED is on. Note: If a remote mode and pulser functions are active, their respective LEDs will be illuminated.

The [20] displayed on the amps meter is AC start amps (it is also the factory default setting – [30] for DC start amps), and can be adjusted from 1 to 200 amps by turning the Encoder control.

To change start amps, proceed to Section D. To save changes to TIG HF Impulse Start Amperage without changing start time, turn power Off.

D. Setting Programmable Start Time (All Models)

Non CE Models Only



NOTE: Before accessing programmable start time mode, be sure that all procedures and parameters are established. Especially, check for proper amperage setting (see Section 4-8). Parameter adjustment is limited while Programmable Start Time mode is active.

Welding cycle can be executed while in programmable start mode, but program parameters cannot be adjusted while in this mode.

A 1 Amperage Switch Pad

2 Encoder Control

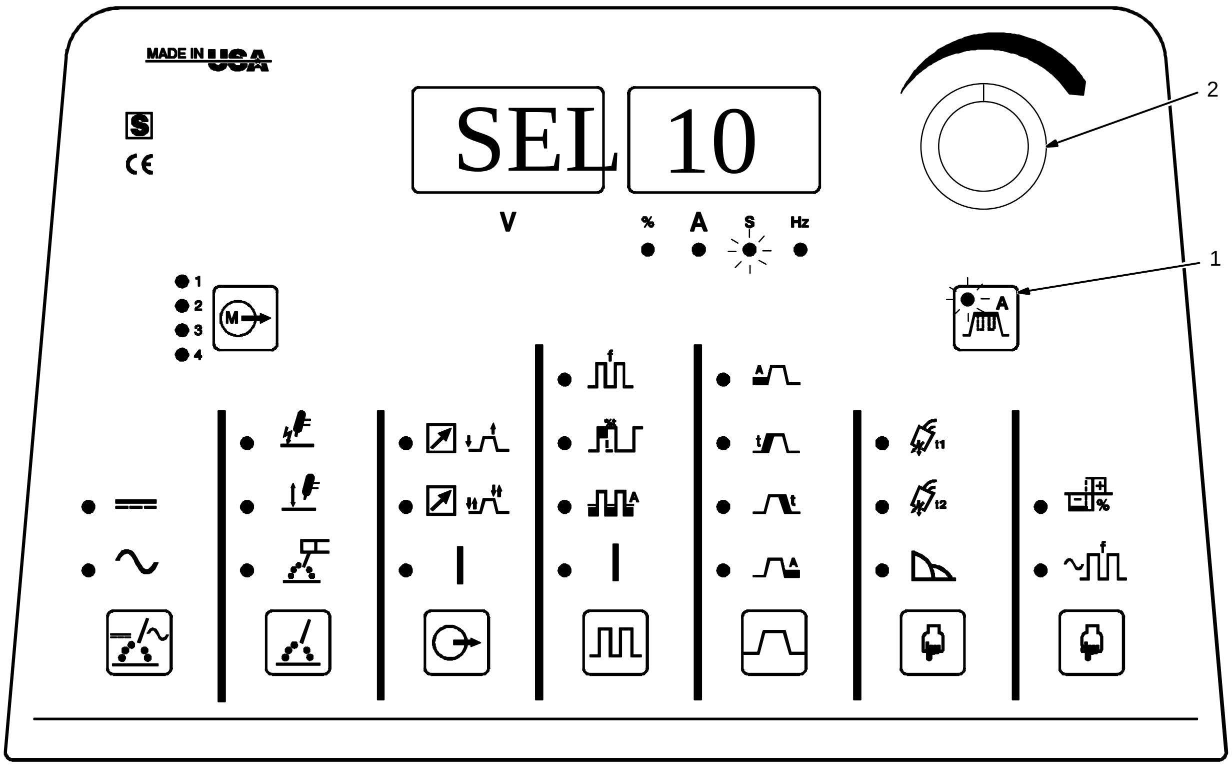
To adjust Programmable Start Time proceed as follows:

Press Amperage switch pad. Switch pad LED turns on, meter S LED turns on, and [SEL] [10] is displayed on meters.

The [10] displayed on the amps meter is the factory default AC setting ([SEL] [3] is the factory default DC setting), and can be adjusted from 1 to 200 milliseconds by turning the Encoder control.

To save changes, turn power Off.

CE Models Only



NOTE: Before accessing programmable start time mode, be sure that all procedures and parameters are established. Especially, check for proper amperage setting (see Section 4-8). Parameter adjustment is limited while Programmable Start Time mode is active.

Welding cycle can be executed while in programmable start mode, but program parameters cannot be adjusted while in this mode.

1 Amperage Switch Pad

2 Encoder Control

To adjust Programmable Start Time proceed as follows:

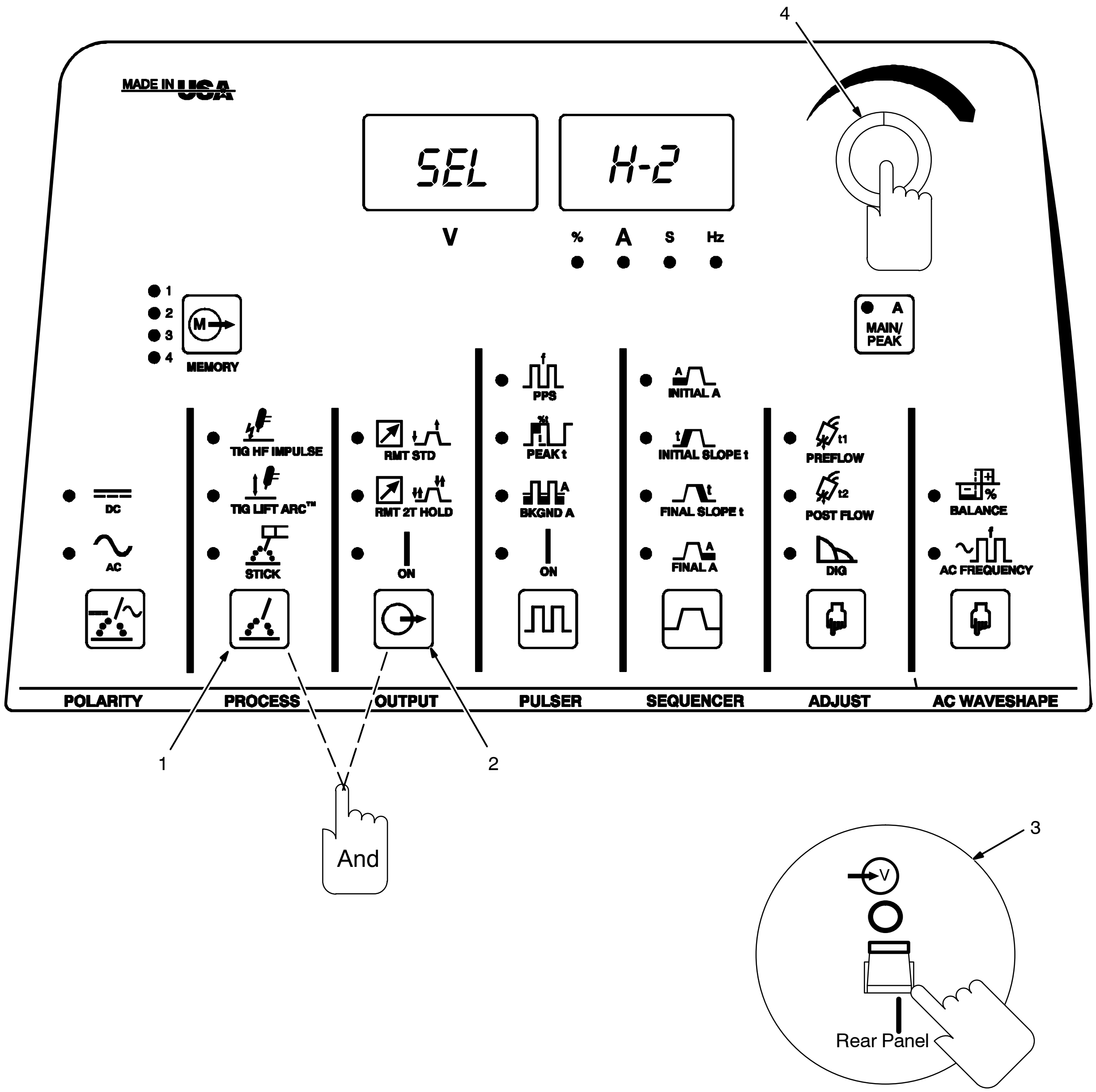
Press Amperage switch pad. Switch pad LED turns on, meter S LED turns on, and [SEL] [10] is displayed on meters.

The [10] displayed on the amps meter is the factory default AC setting ([SEL] [3] is the factory default DC setting), and can be adjusted from 1 to 200 milliseconds by turning the Encoder control.

To save changes, turn power Off.

4-14. Reconfiguring 2T For 4T, 4T Momentary, Mini Logic Control, Or Spot (DX, LX And All CE Models)

Non CE Models Only



1 Process Switch Pad

2 Output Switch Pad

3 Power Switch

To reconfigure 2T, turn power off. Push and hold the Process and Output switch pads and turn On power switch. Hold switch pads for approximately 7 seconds (or until software version number_______-_clears, and meters display [SEL] [H-2]).

4 Encoder Control

Use Encoder to change functions. Active function will be displayed on amperage (right) meter.

5 Meter Displays

Meter displays for the different functions will be as shown.

Press torch trigger or turn power Off to save setting.

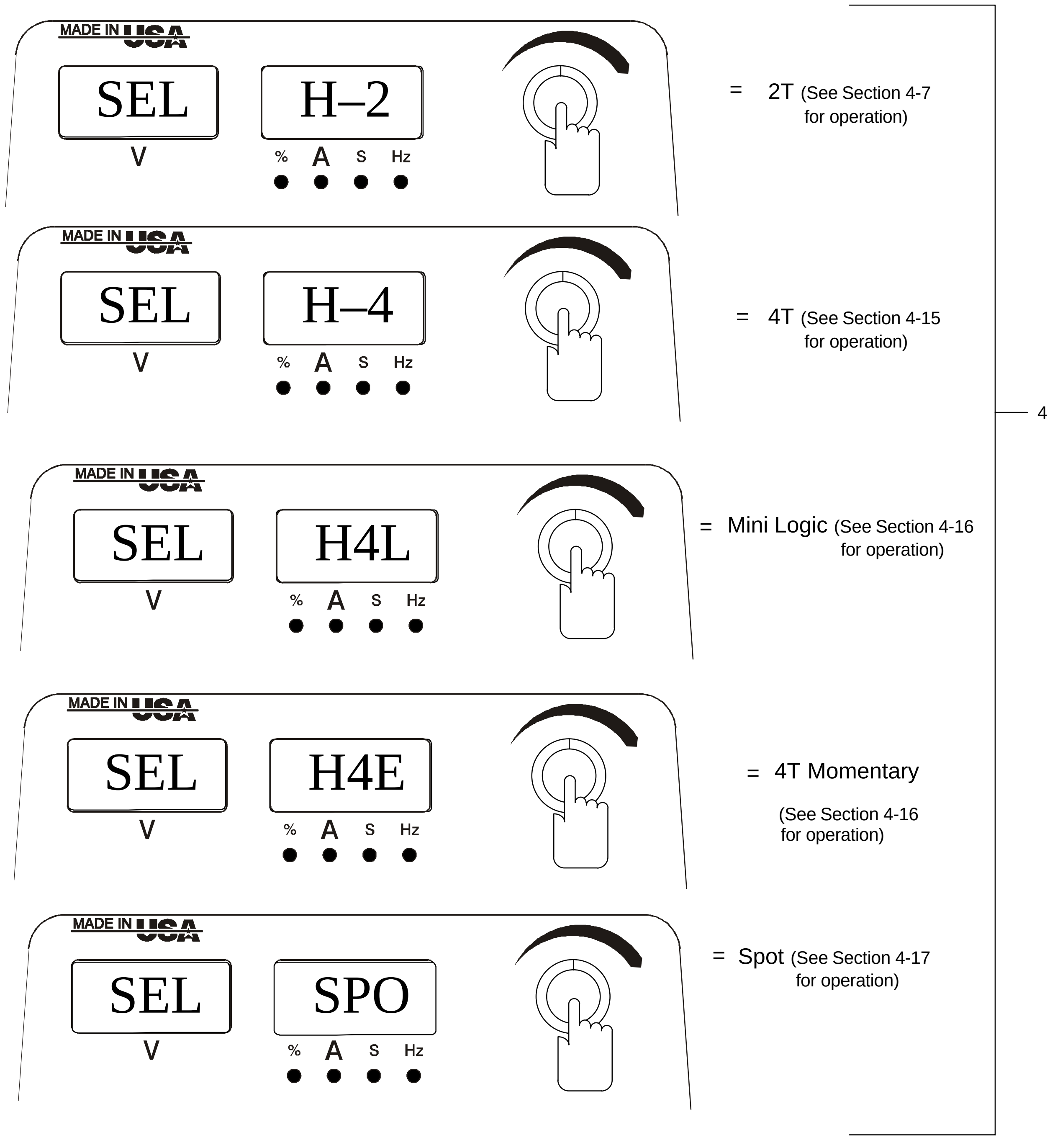
Proceed to Section 4-15 for 4T, [SEL] [H-4], operation. Sequencer option required to reconfigure for 4T.

Proceed to Section 4-16 for Mini Logic, [SEL] [H-4L], operation. Sequencer option required to reconfigure for Mini Logic.

Proceed to Section 4-16 for 4T Momentary, [SEL] [H-4E], operation. Sequencer option required to reconfigure for 4T Momentary.

Proceed to Section 4-17 for Spot Control, [SEL] [SPO], Operation.

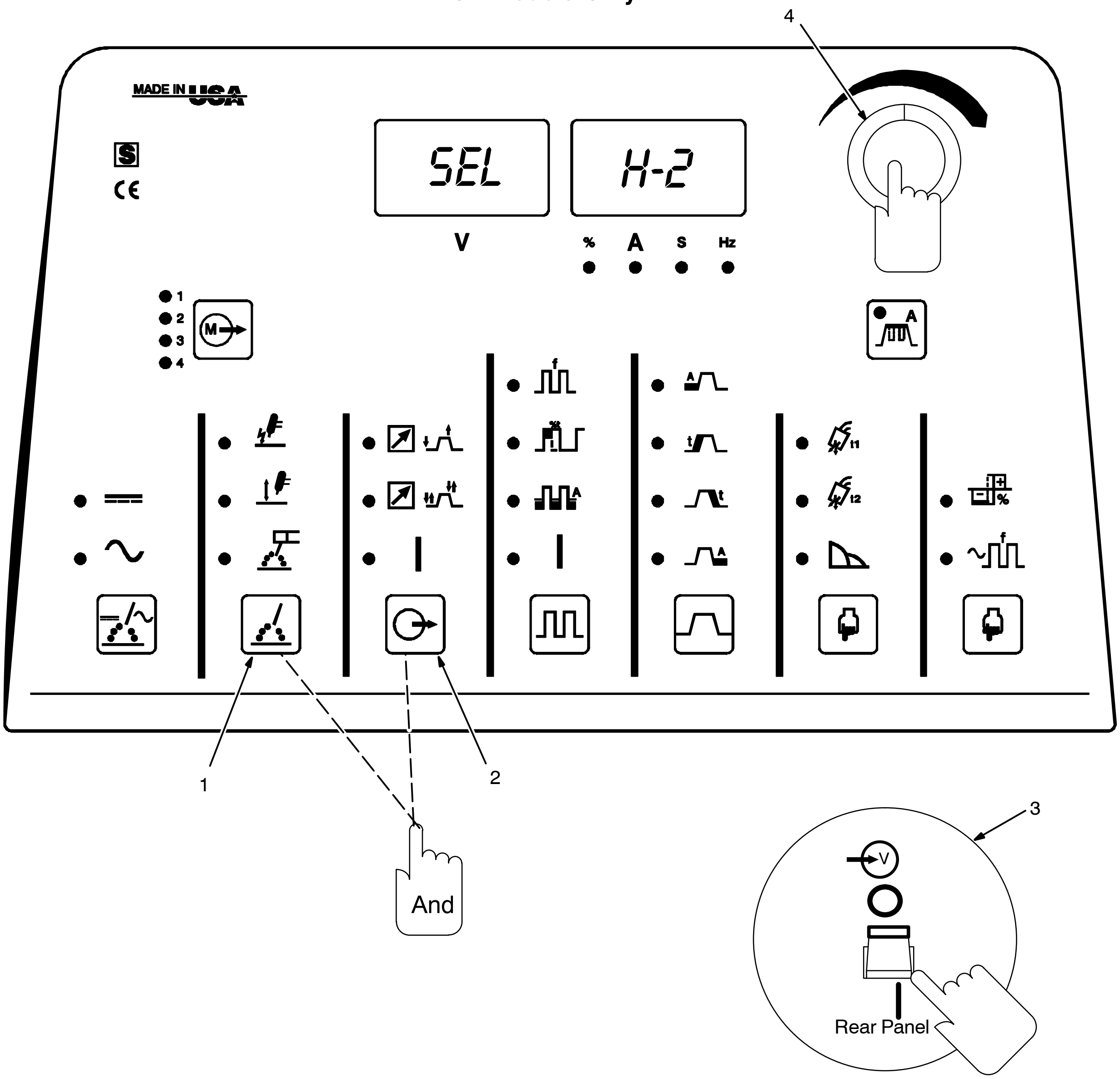
NOTE: After 2T has been reconfigured and one of the reconfigured functions is selected during normal operation, upon power up, H-4, H4L, H4E OR SPO will be displayed for 5 seconds as a reminder to the operator.



MADE IN USA
SEL
H–2
V
% A S Hz
= 2T (See Section 4-7 for operation)
SEL
H–4
= 4T (See Section 4-15 for operation)
SEL
H4L
= Mini Logic (See Section 4-16 for operation)
SEL
H4E
= 4T Momentary
(See Section 4-16 for operation)
SEL
SPO
= Spot (See Section 4-17 for operation)
4

Reconfiguring 2T For 4T, 4T Momentary, Mini Logic Control, Or Spot (DX, LX And All CE Models) (Continued)

CE Models Only



1 Process Switch Pad

2 Output Switch Pad

3 Power Switch

To reconfigure 2T, turn power off. Push and hold the Process and Output switch pads and turn On power switch. Hold switch pads for approximately 7 seconds (or until software version number _ _ _ _ _ _-_clears, and meters display [SEL] [H-2]).

4 Encoder Control

Use Encoder to change functions. Active function will be displayed on amperage (right) meter.

5 Meter Displays

Meter displays for the different functions will be as shown.

Press torch trigger or turn power Off to save setting.

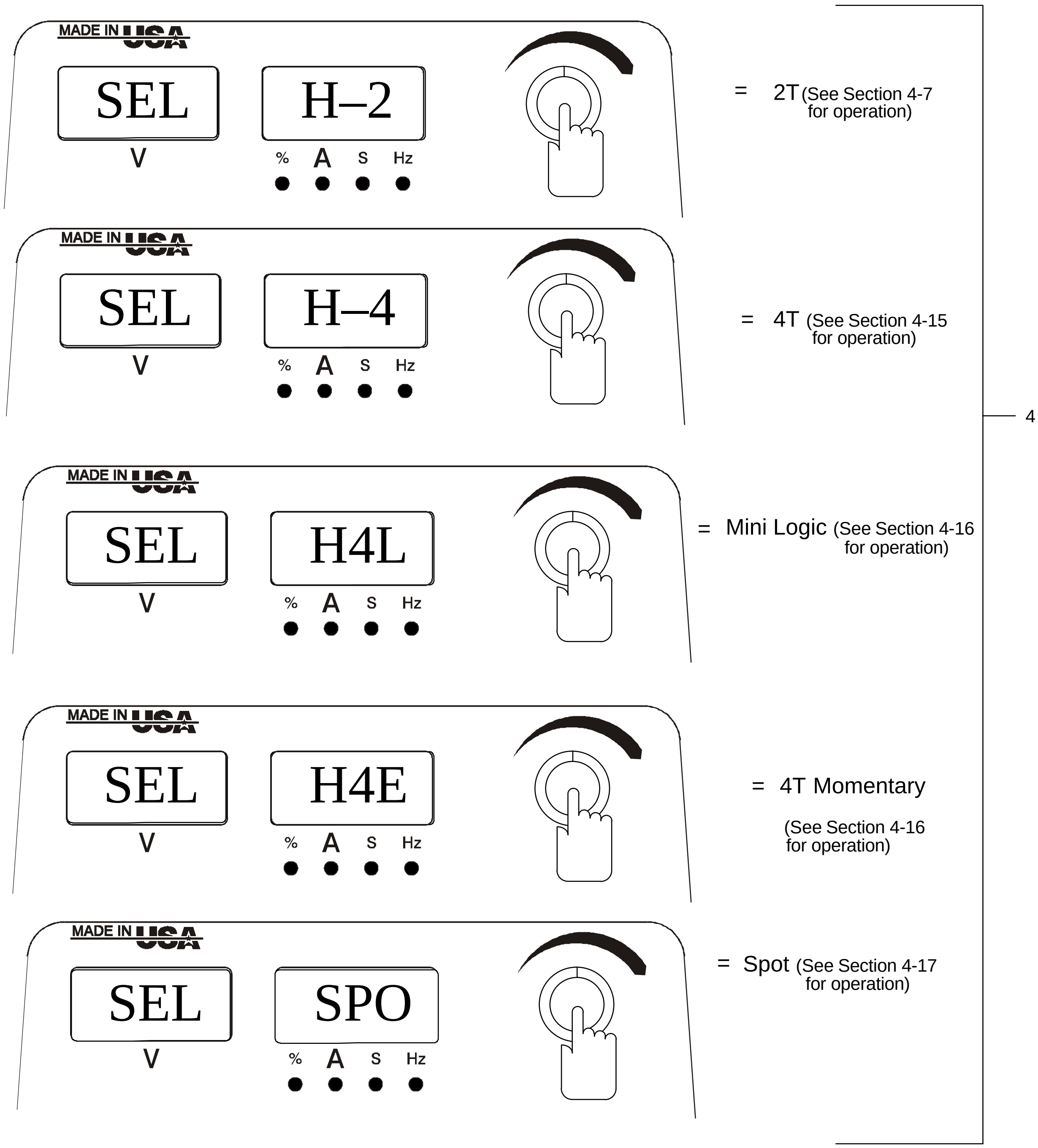
Proceed to Section NO TAG for 4T, [SEL] [H-4], operation. Sequencer option required to reconfigure for 4T.

Proceed to Section NO TAG for Mini Logic, [SEL] [H-4L], operation. Sequencer option required to reconfigure for Mini Logic.

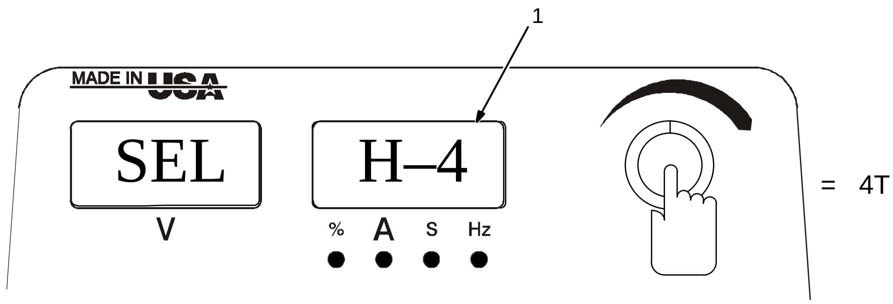
Proceed to Section NO TAG for 4T Momentary, [SEL] [H-4E], operation. Sequencer option required to reconfigure for 4T Momentary.

Proceed to Section NO TAG for Spot Control, [SEL] [SPO], Operation.

NOTE: After 2T has been reconfigured and the 2T LED is on, of the reconfigured functions is selected during normal operation, upon power up, H-4, H4L, H4E OR SPO will be displayed for 5 seconds as a reminder to the operator.


MADE IN USA
SEL
H–2
V
% A S Hz
= 2T (See Section 4-7 for operation)
SEL
H–4
= 4T (See Section 4-15 for operation)
SEL
H4L
= Mini Logic (See Section 4-16 for operation)
SEL
H4E
= 4T Momentary
(See Section 4-16 for operation)
SEL
SPO
= Spot (See Section 4-17 for operation)
4

4-15. 4T Specific Trigger Method (DX, LX And All CE Models)



1 4T (Specific Trigger Operation)

Sequencer is required to reconfigure for 4T.

Select 4T according to Section 4-14.

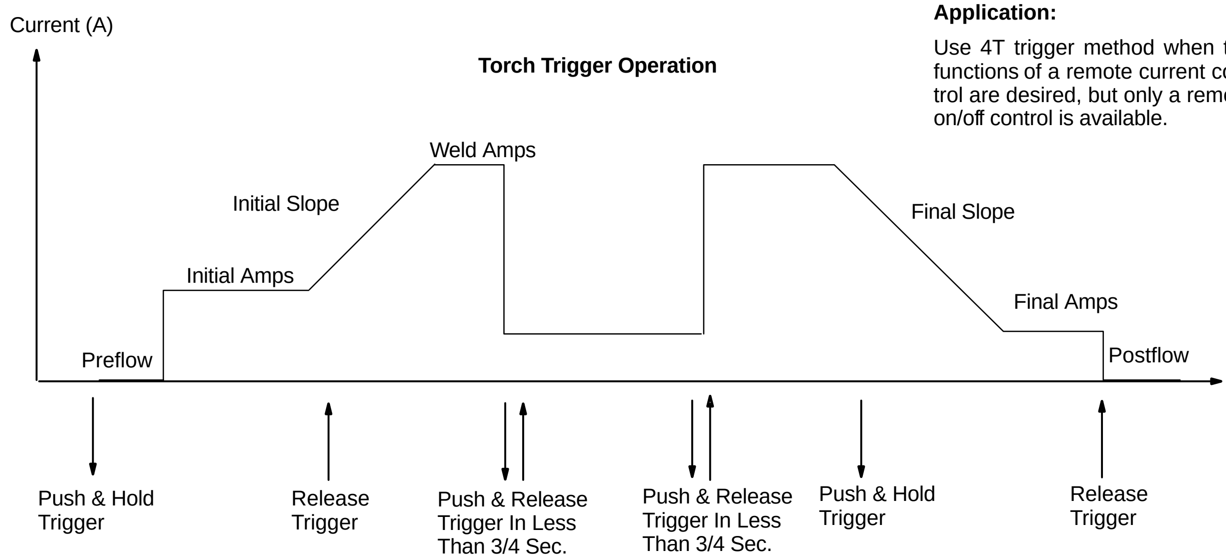
Torch trigger operation is as shown.

While in 4T mode, there is a function available during the main weld sequence that allows the operator to toggle between weld current and final current without breaking the arc.

NOTE: When a remote switch is connected to the welding power source, only trigger input is functional. Amperage is controlled by the welding power source.

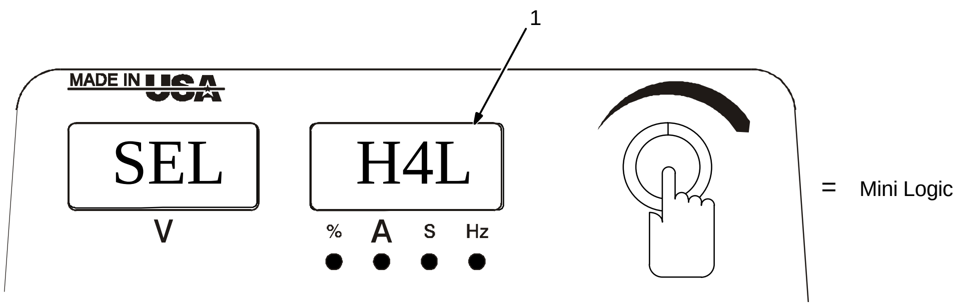
Application:

Use 4T trigger method when the functions of a remote current control are desired, but only a remote on/off control is available.



NOTE: If arc is broken and trigger is depressed, or trigger is still depressed after postflow time is complete, HLP-10 will be displayed (see Section 5-3).

4-16. Mini Logic Operation (DX, LX And All CE Models)



1 Mini Logic Meter Display

Sequencer option required to reconfigure for Mini Logic.

Select Mini Logic according to Section 4-14.

Torch trigger operation is as shown.

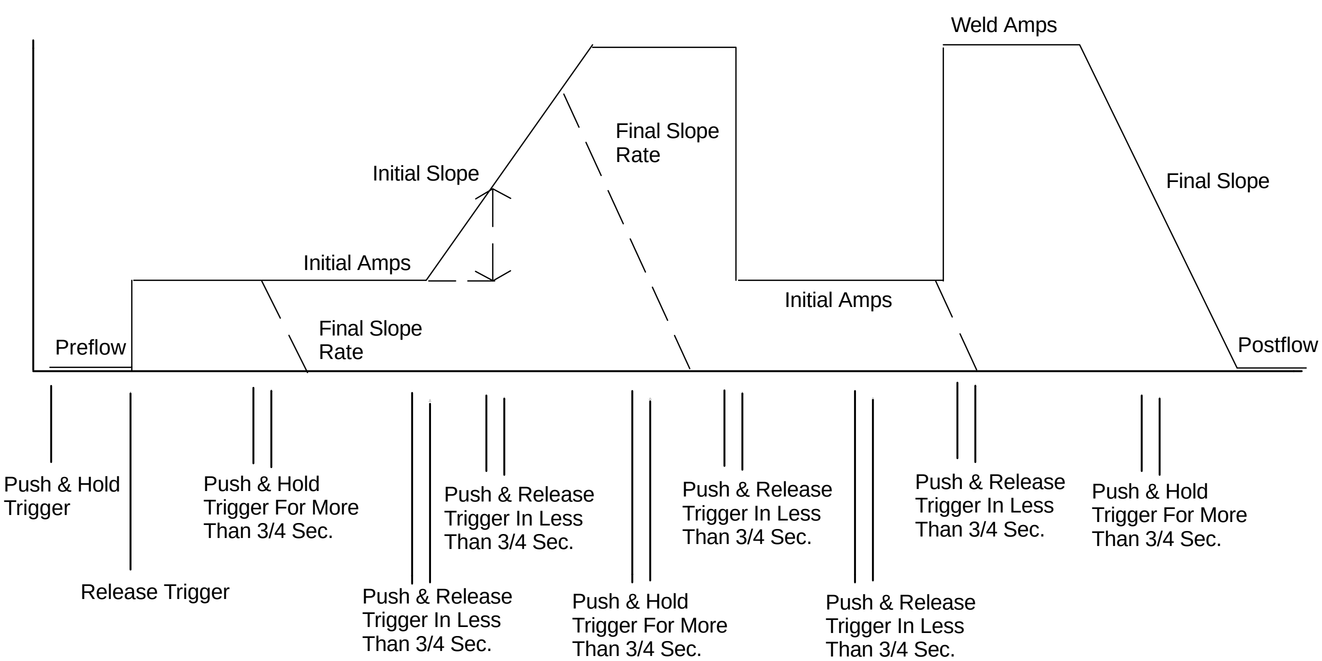
During Mini Logic welding operation, the weld current can be toggled between the initial amps level and the main weld amps level by pressing and releasing the torch trigger in less than 3/4 seconds.

During Mini Logic, Final Amperage is not available. Final slope will always slope to minimum amperage and end the cycle.

NOTE: When a remote switch is connected to the welding power source, only trigger input is functional. Amperage is controlled by the welding power source.

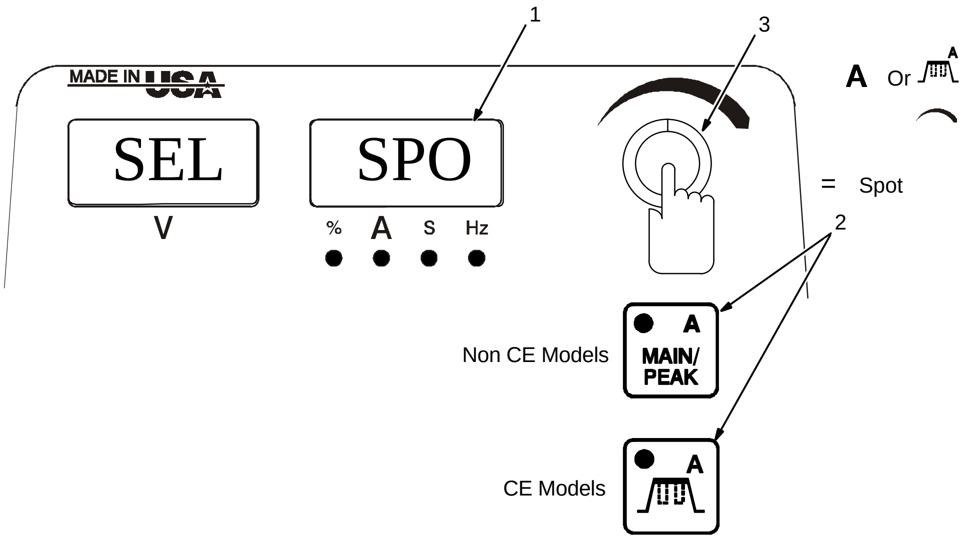
Application: This ability to change current levels without either initial slope or final slope, gives the operator the opportunity to adjust filler metal without breaking the arc.

Torch Trigger Operation



NOTE: If arc is broken and trigger is depressed, or trigger is still depressed after postflow time is complete, HLP-10 will be displayed (see Section 5-3).

4-17. Spot Control Operation (All Models)



1 Spot Function Meter Display

Select Spot function according to Section 4-14.

2 Amperage Switch Pad

3 Encoder Control

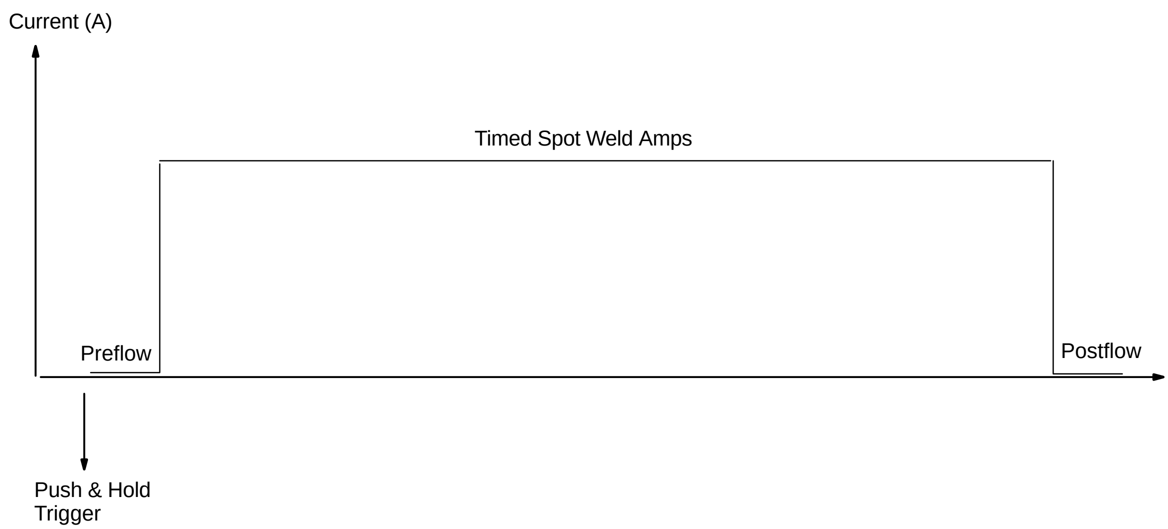
Set spot parameters as follows: Press Amperage switch pad once (meter A LED turns on) and turn Encoder to set spot amperage. Press Amperage switch pad again, (meter S LED lights) and turn Encoder to set spot time (.1–25 seconds). Factory default setting is 1 second.

NOTE: While in Spot Control, Sequencer settings will be ignored, and will not be programmable.

NOTE: While in Spot Control, when a remote switch is connected to the welding power source, only trigger input is functional. Amperage is controlled by the welding power source.

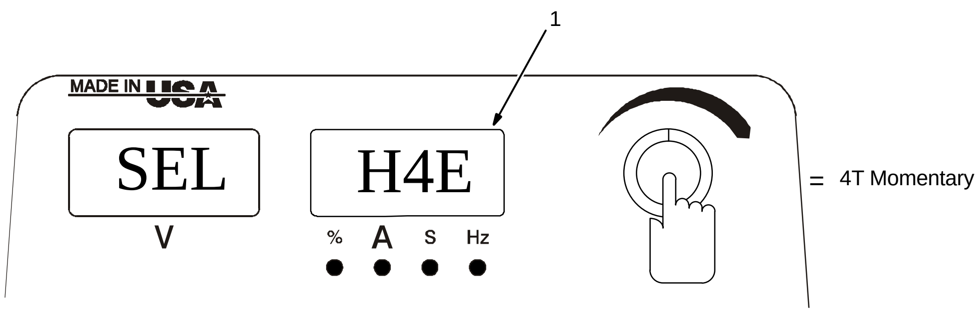
Torch trigger operation is as shown.

Application: To provide a timed weld. Used for tacking, and thin sheet joining.



NOTE: If arc is broken and trigger is depressed, or trigger is still depressed after postflow time is complete, HLP-10 will be displayed (see Section 5-3).

4-18. 4T Momentary Operation (DX, LX And All CE Models)



1 4T Momentary Meter Display

Select 4T Momentary according to Section 4-14.

If unit is equipped with Sequence Controls, a 4T Momentary trigger method is available.

4T Momentary torch trigger operation is as shown.

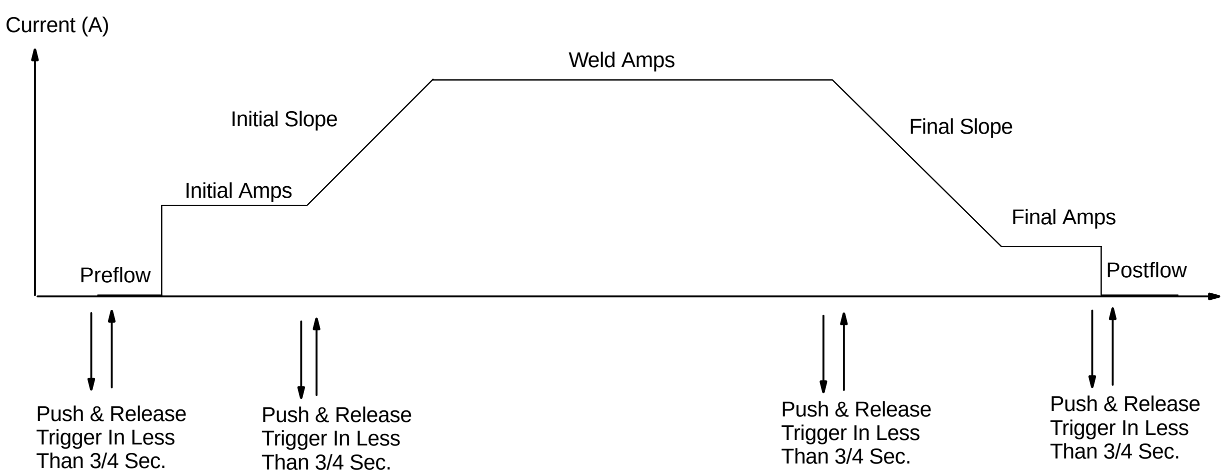
While in 4T Momentary mode, once the operator toggles out of weld current and begins final slope, toggling again will break the arc and go to postflow.

NOTE: When a remote switch is connected to the welding power source, only trigger input is functional. Amperage is controlled by the welding power source.

Application:

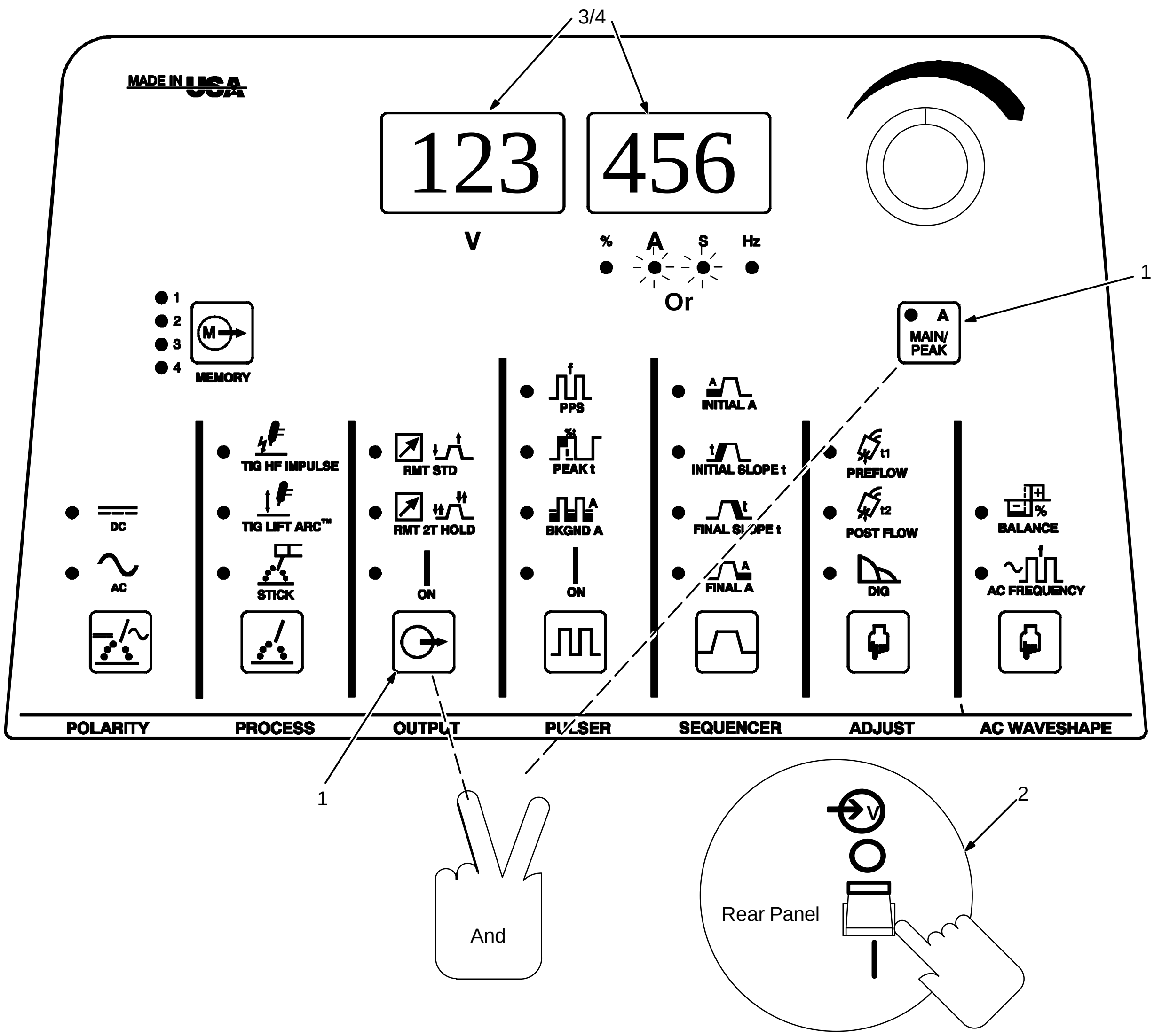
Use 4T Momentary trigger method when the functions of a remote current control are desired, but only a remote on/off control is available.

Select 4T Momentary trigger method according to Section 4-14.



4-19. Arc Timer/Counter Display (All Models)

Non CE Models



A

1 Output And Amperage Controls

2 Power Switch

To display the arc timer/counter, turn power off. Push and hold Output and Amperage control switch pads, and turn On Power switch. Hold switch pads for approximately 7 seconds (or until software version number
_ _ _ _ _ _-_clears meters).

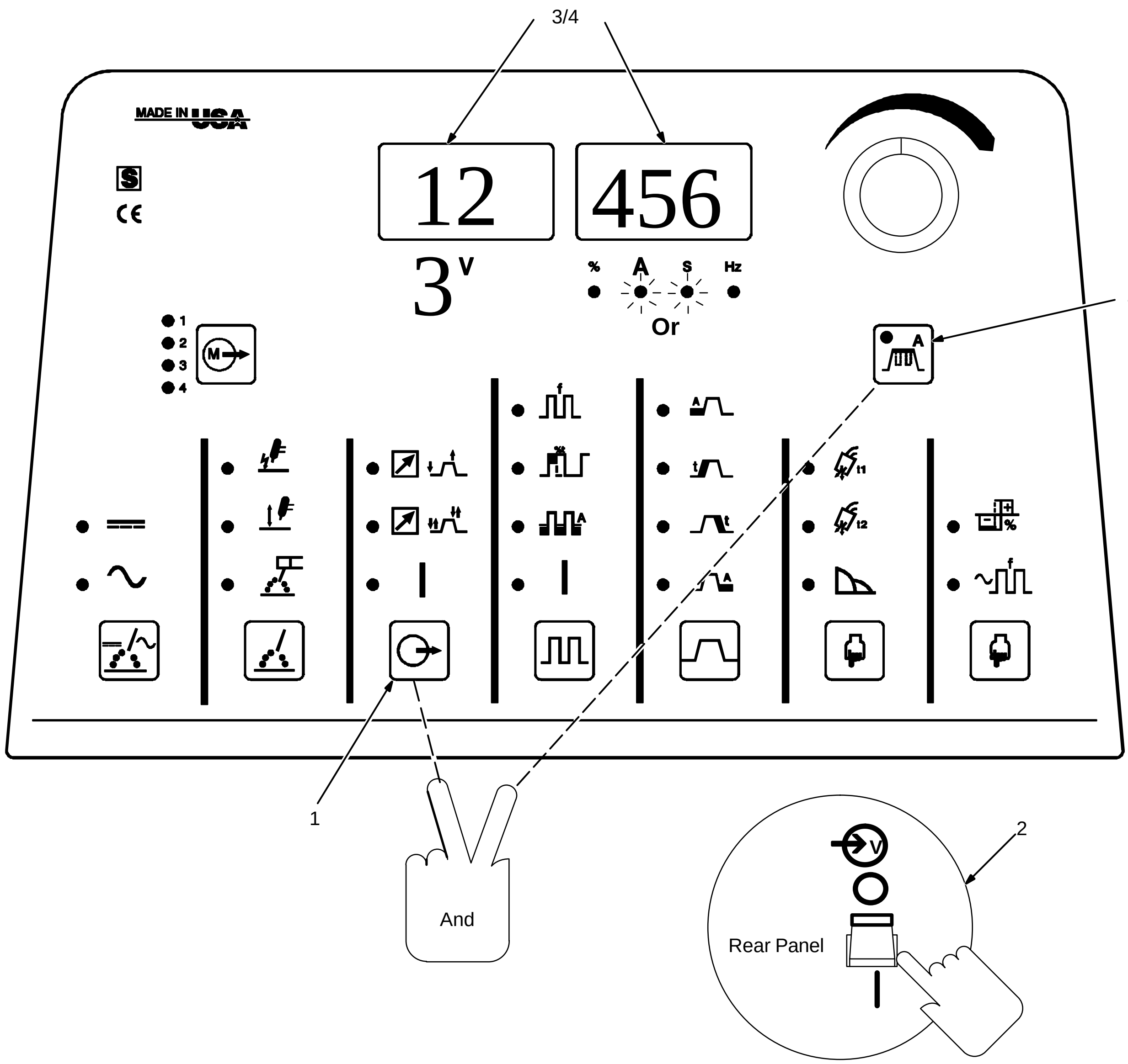
3 Arc Timer Display

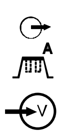
Upon power up as described above, the meter S LED will turn on, and arc time will be displayed for 5 seconds as [000 000] to [999 999]. The first four numbers indicate hours, and the last two numbers indicate minutes. Arc time shown in example is read as 1,234 hours and 56 minutes. Maximum arc time is 9,999 hours and 59 minutes.

4 Arc Counter

After 5 seconds, the meter A LED turns on, and the arc counter will be displayed for the next 5 seconds as [000 000] to [999 999]. The maximum arc cycle count is 999 999.

CE Models





1 Output And Amperage Controls

2 Power Switch

To display the arc timer/counter, turn power off. Push and hold Output and Amperage control switch pads, and turn On Power switch. Hold switch pads for approximately 7 seconds (or until software version number _ _ _ _ _ _-_clears meters).

3 Arc Timer Display

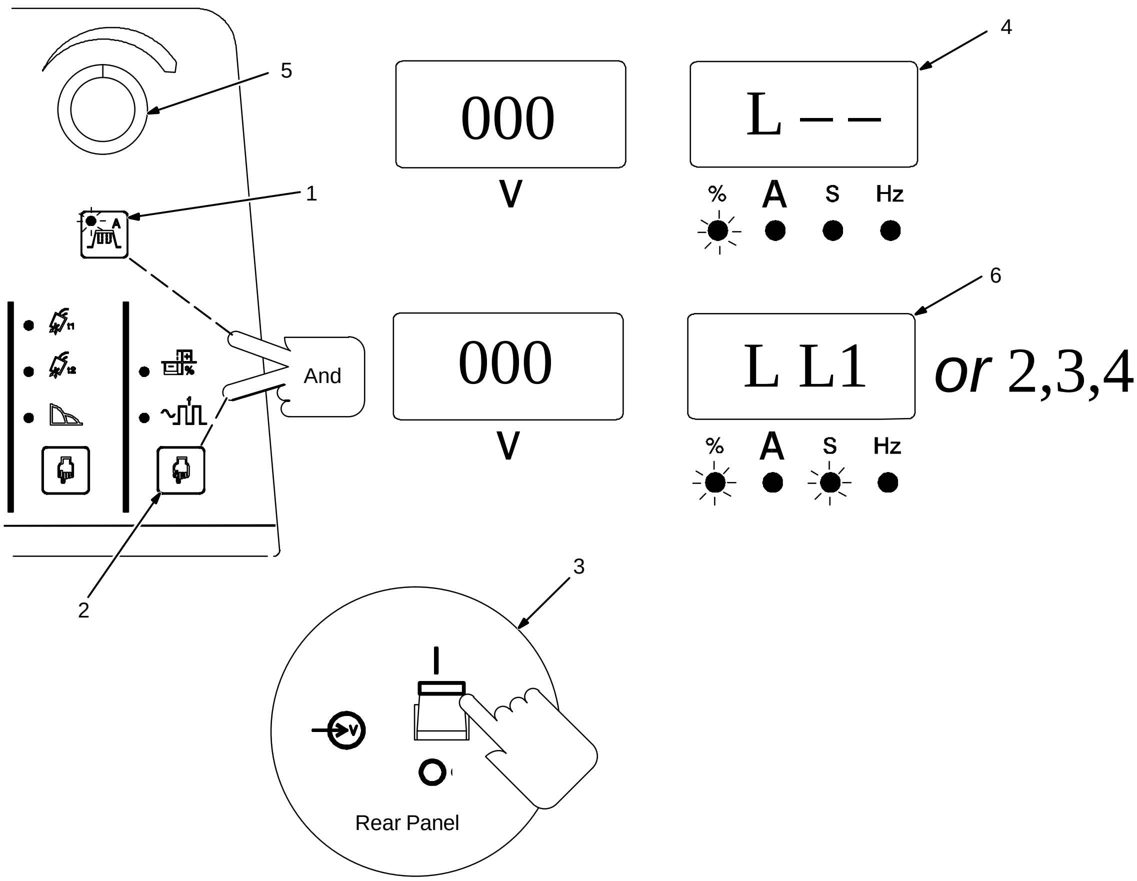
Upon power up as described above, the meter S LED will turn on, and arc time will be displayed for 5 seconds as [000 000] to [999 999]. The first four numbers indicate hours, and the last two numbers indicate minutes. Arc time shown in example is read as 1,234 hours and 56 minutes. Maximum arc time is 9,999 hours and 59 minutes.

4 Arc Counter

After 5 seconds, the meter A LED turns on, and the arc counter will be displayed for the next 5 seconds as [000 000] to [999 999]. The maximum arc cycle count is 999 999.

4-20. Lockout Functions

A. Accessing Lockout Capability



See Section 4-1 for explanation of controls referred to in all of Section 4-20.

There are four (1–4) different lockout levels. Each successive level allows the operator more flexibility.

NOTE: Before activating lockout levels, be sure that all procedures and parameters are established. Parameter adjustment is limited while lockout levels are active.

NOTE: If lockout feature is active, upon power up, after software version number clears meter displays, the amperage (right) meter will display the active lockout level [LL1] or 2, 3, 4..

1 Amperage (A) Switch Pad

2 Adjust Switch Pad

3 Power Switch

To access lockout screens, press and hold the Amperage and Adjust switch pads, and turn On power switch. Hold switch pads for approximately 7 seconds (or until software version number _ _ _ _ _ _-_clears meters).

4 Lockout Off

Upon power up as described, the meter % and Amperage (A) switch pad LED's light, and the meter display will be as shown for a lockout off condition.

5 Encoder Control

To turn On the lockout feature, proceed as follows:

Pressing Amperage (A) switch pad will toggle between the meter % and S LED's. Toggle switch pad until % LED is on.

Turn Encoder control to select a three digit lockout number. Number will appear on the voltage (left) meter. Select any number from [001] thru [999]. **IMPORTANT:** remember this three digit number, as you will need it to turn the lockout feature off.

Toggle Amperage (A) switch pad to light the meter S LED. You may now select a lockout level.

There are four lockout levels available. Turn Encoder control to access a lockout level (see Sections B and/or C for lockout level descriptions).

6 Lockout On

Once the desired three digits have been entered and a lockout level selected, the meter screens will change to [000 [LL1] or 2, 3, 4.

Press torch trigger or turn Off power to complete lockout on sequence.

NOTE: Setting a three digit lockout number of [000], or setting a lockout level of [L—] will cause a lockout off condition.

To turn Off the lockout feature, proceed as follows:

To access lockout screens, press and hold the Amperage (A) and Adjust switch pads, and turn On power switch. Hold switch pads for approximately 7 seconds (or until software version number _ _ _ _ _ _-_clears meters).

Upon power up as described, the meter % and Amperage (A) switch pad LED's will turn on, and the meter display will be as shown for a lockout on (see callout 6) condition.

Use Encoder control to enter the same three digits that were used to turn on the lockout feature.

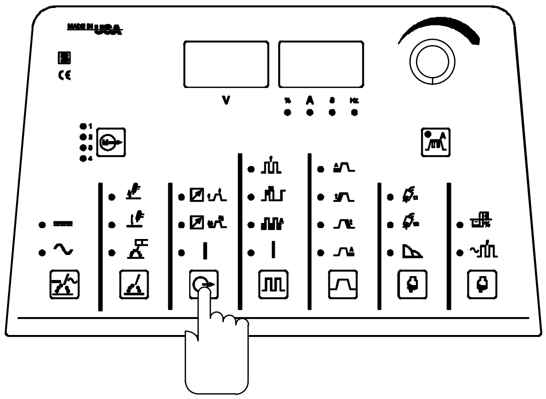
Press the Amperage (A) switch pad. The meter % LED will turn off, and the % and S LED's will light. The amperage (right) meter display will change to [L—]. The lockout feature is now off.

NOTE: Setting a three digit lockout number of [000], or setting a lockout level of [L—] will also cause a lockout off condition.

Press torch trigger or turn Off power to complete lock out Off sequence.

B. LockOut Levels

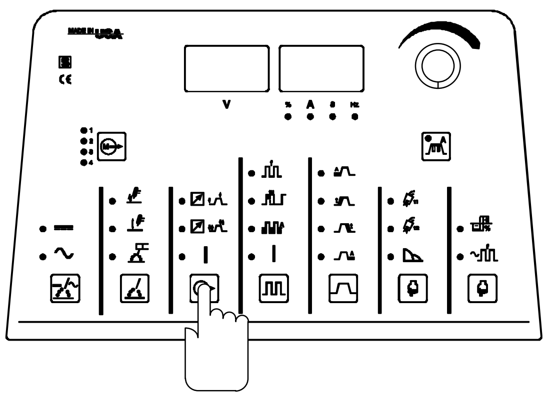
Level 1



Use Output Switch Pad To

Select A Trigger Method

For The TIG Process

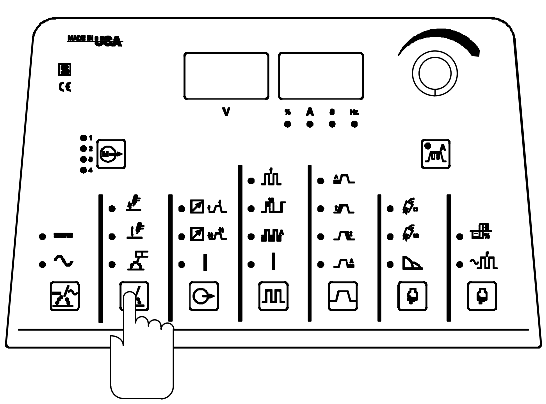


Use Output Switch Pad To

Select A Trigger Method

For The Stick Process

Level 2



Select Stick, Or Lift-Arc,
Or HF Start

Process Selection

Level 1

NOTE: Before activating lock out levels, be sure that all procedures and parameters are established. Parameter adjustment is limited while lock out levels are active.

NOTE: Remote amperage control is not available in level 1.

TIG Output Selection

If either the TIG Impulse HF or TIG Lift Arc process (see Section 4-7) was active when lockout level 1 was activated, the operator can choose between RMT STD (Remote Standard) or RMT 2T HOLD (Remote 2T Hold). The On function is also available if TIG Lift Arc was active.

If RMT 2T was reconfigured (see Section 4-14) prior to lockout level 1 activation, the reconfigured output mode (4T, 4T momentary, mini logic, or spot) is available to the operator instead of RMT 2T.

Stick Output Selection

If the Stick process was active when lockout level 1 was activated, the operator can choose between RMT STD or On.

Process selection may not be changed in lockout level 1. If the operator tries to change his process selection, the amperage (right) meter will display [LL!] as a reminder.

The parameters for the remaining functions may be viewed by pressing the appropriate switch pads, but if unit is equipped with a pulser and the pulser is off, [LL1] will be displayed as a reminder that the pulser is off.

Level 2

NOTE: Before activating lockout levels, be sure that all procedures and parameters are established. Parameter adjustment is limited while lockout levels are active.

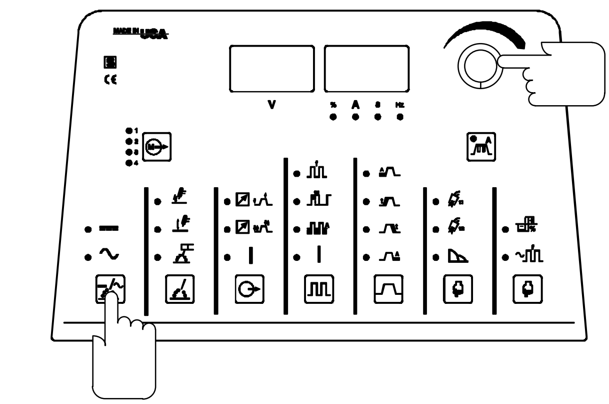
NOTE: Remote amperage control is not available in level 2.

Includes all the functions of level 1 plus **Process Selection** (see Section 4-5).

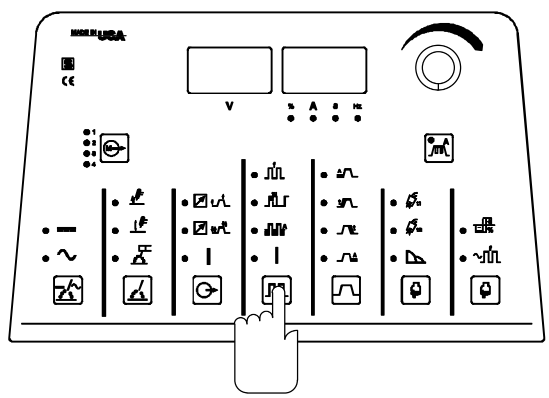
The parameters for the remaining functions may be viewed by pressing the appropriate switch pads, but if unit is equipped with a pulser and the pulser is off, [LL2] will be displayed as a reminder that the pulser is off.

C. Lock Out Levels (Continued)

Level 3



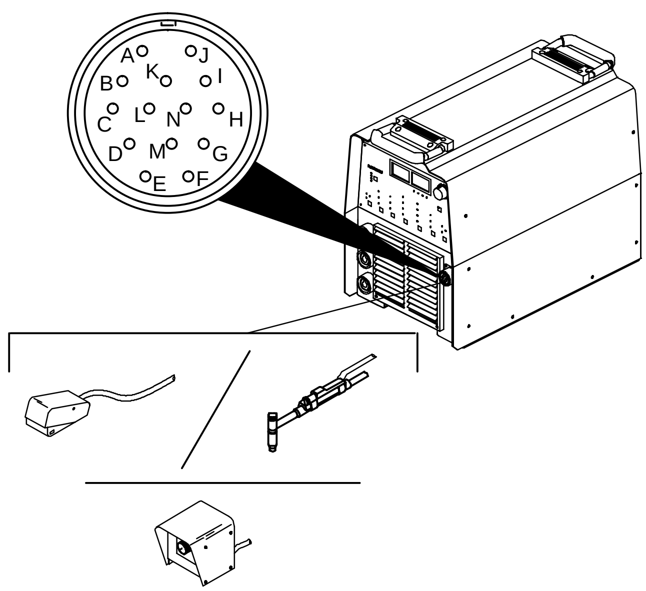
+/– 10 % Amperage Adjust Control



Pulser On/Off Control

Remote Amperage Control

Level 4



Level 3

NOTE: Before activating lockout levels, be sure that all procedures and parameters are established. Parameter adjustment is limited while lockout levels are active.

NOTE: Remote amperage control is not available in level 3.

Includes all the functions of levels 1 and 2 plus the following:

+/– 10% adjustment of preset TIG or Stick Weld Amps

Select desired process, TIG or Stick, and use Encoder control to adjust amperage +/– 10% of preset amperage value, up to the limits of the machine. If operator tries to go beyond the +/– 10%, the amperage (right) meter will display [LL3] as a reminder.

Pulser ON/Off Control

Gives operator the ability to turn on/off the Pulser control.

The parameters for the remaining functions may be viewed by pressing the appropriate switch pads.

Level 4

NOTE: Before activating lockout levels, be sure that all procedures and parameters are established. Parameter adjustment is limited while lockout levels are active.

Includes all the functions of levels 1, 2, and 3 plus the following:

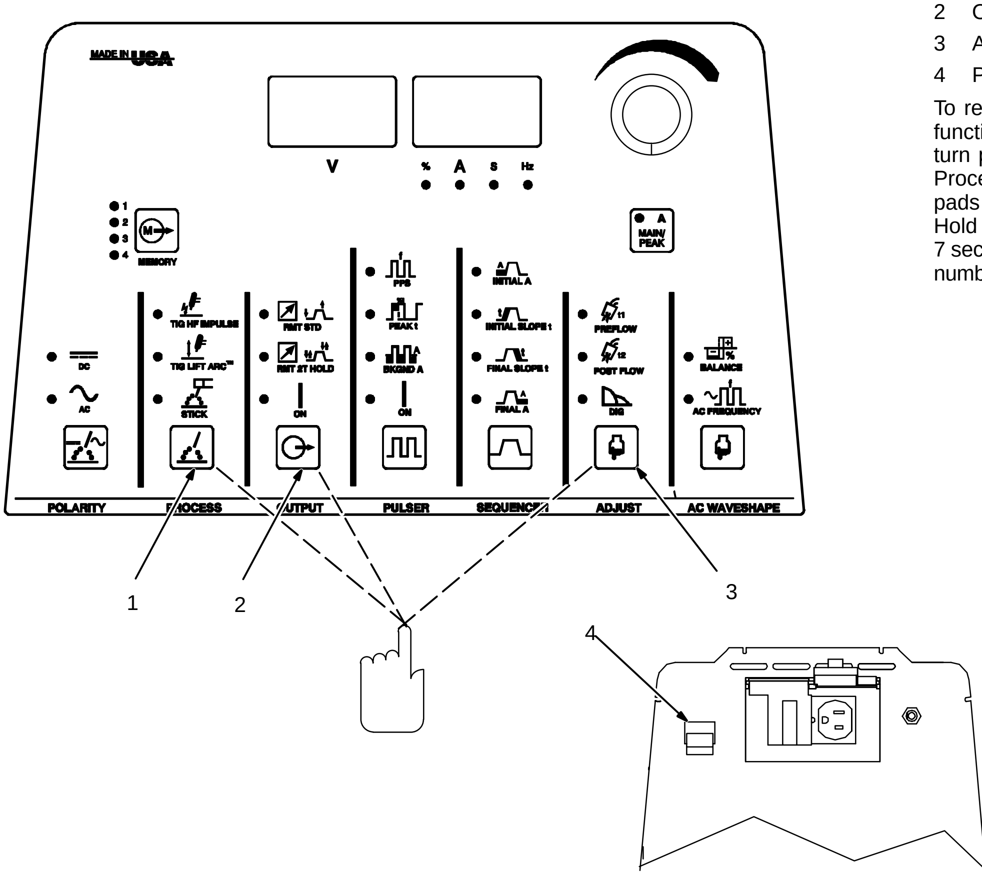
Remote Amperage Control

Allows operator to use remote amperage control if desired. Remote control operates from minimum to maximum of preset amperage value. Connect remote control device according to Section 3-7.

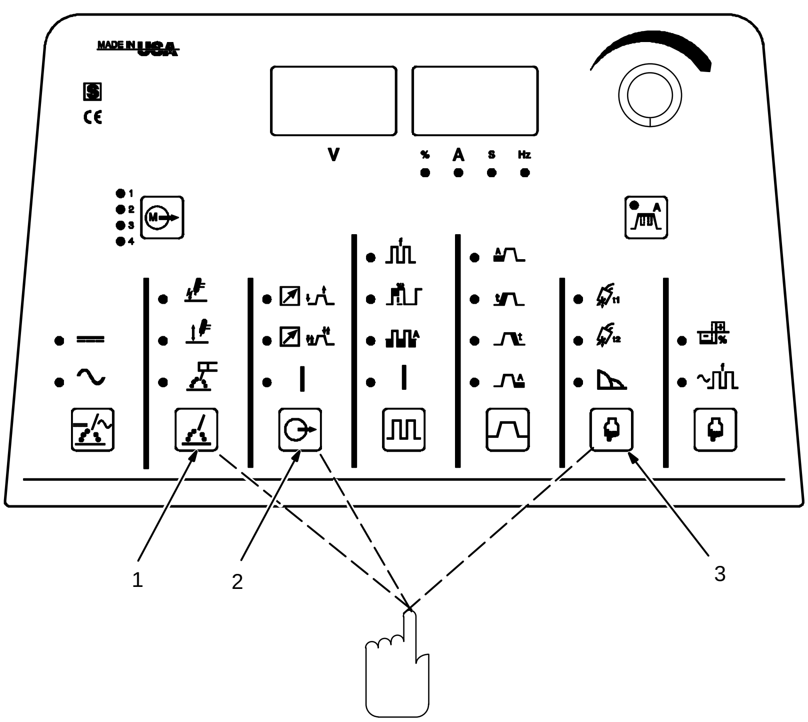
4-21. Resetting Unit To Factory Default Settings (All Models)

1 Process Switch Pad
2 Output Switch Pad
3 Adjust Switch Pad
4 Power Switch

To reset all welding power source functions to original factory settings, turn power off. Push and hold the Process, Output and Adjust switch pads and turn On power switch. Hold switch pads for approximately 7 seconds (or until software version number _ _ _ _ _ _-_clears meters).

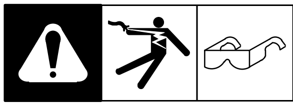


CE Models



SECTION 5 – MAINTENANCE AND TROUBLESHOOTING

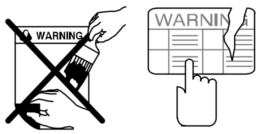
5-1. Routine Maintenance



▲ **Disconnect power before maintaining.**

3 Months

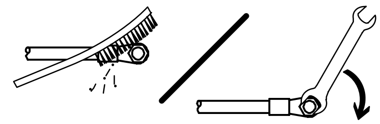
Replace unreadable labels.



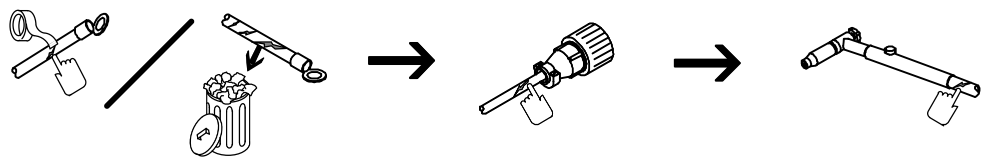
Replace damaged gas hose.



Clean and tighten weld terminals.

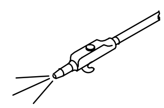


Repair or replace cracked cables and cords.

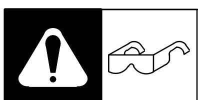


6 Months

Blow out inside. During heavy service, clean monthly.

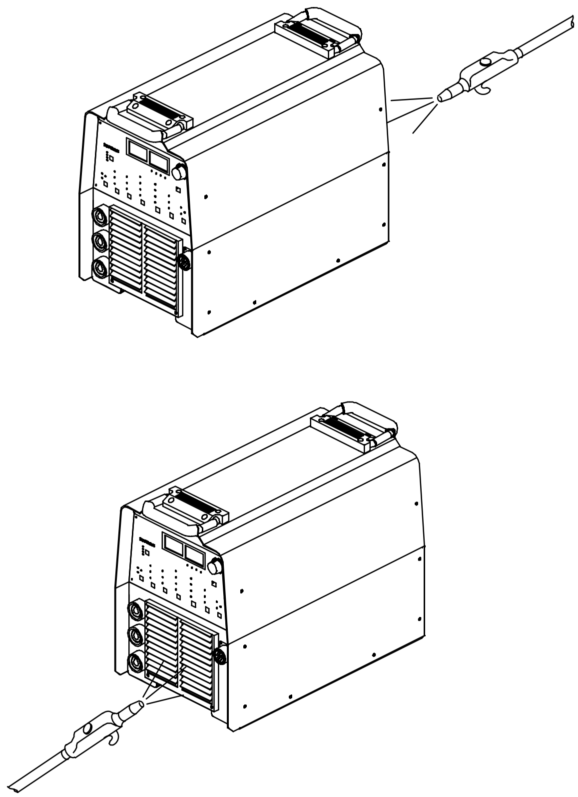


5-2. Blowing Out Inside of Unit



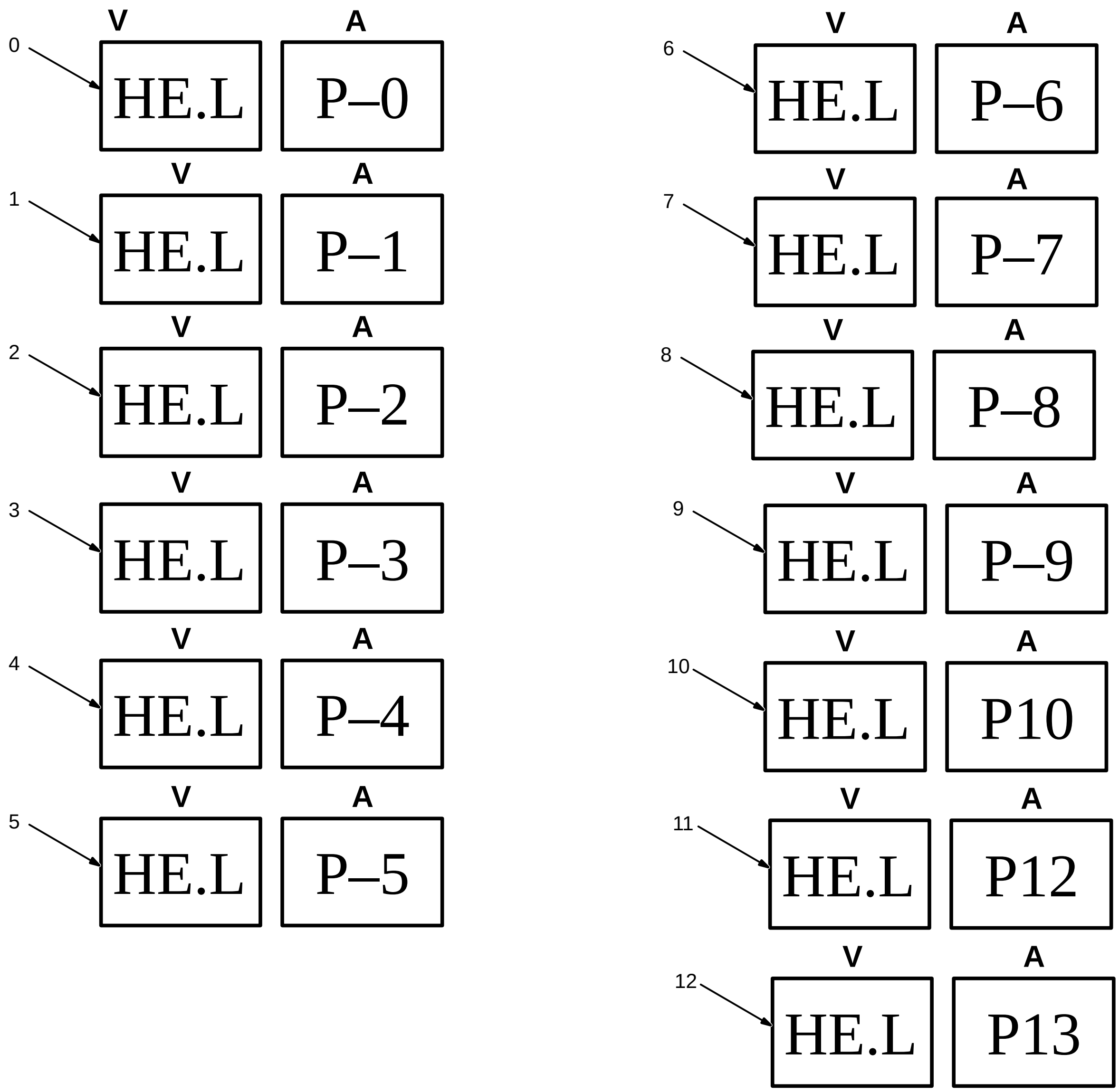
▲ **Do not remove case when blowing out inside of unit.**

To blow out unit, direct airflow through front and back louvers as shown.



ST-802 135-B

5-3. Voltmeter/Ammeter Help Displays



☞ *All directions are in reference to the front of the unit. All circuitry referred to is located inside the unit.*

0 Help 0 Display

Indicates a short in the thermal protection circuitry located on the left side of the unit. Contact a Factory Authorized Service Agent if this display is shown.

1 Help 1 Display

Indicates a malfunction in the primary power circuit caused by an overcurrent condition in the primary IGBT switching circuit. Contact a Factory Authorized Service Agent if this display is shown.

2 Help 2 Display

Indicates an open in the thermal protection circuitry located on the left side of the unit. Contact a Factory Authorized Service Agent if this display is shown.

3 Help 3 Display

Indicates the left side of the unit has overheated. The unit has shut down to allow the fan to cool it (see Section 3-3). Operation will continue when the unit has cooled.

4 Help 4 Display

Indicates an open in the thermal protection circuitry located on the right side of the unit. Contact a Factory Authorized Service Agent if this display is shown.

5 Help 5 Display

Indicates the right side of the unit has overheated. The unit has shut down to allow the fan to cool it (see Section 3-3). Operation will continue when the unit has cooled.

6 Help 6 Display

Indicates that the input voltage is too low and the unit has automatically shut down. Operation will continue when the voltage is within the operating range (±10%). Have an electrician check the input voltage if this display is shown.

7 Help 7 Display

Indicates that the input voltage is too high and the unit has automatically shut down. Operation will continue when the voltage is within the operating range (±10%). Have an electrician check the input voltage if this display is shown.

8 Help 8 Display

Indicates a malfunction in the secondary power circuit of the unit. There is a high open circuit condition. Contact a Factory Authorized Service Agent if this display is shown.

9 Help 9 Display

Indicates a short in the thermal protection circuitry located on the right side of the unit. Contact a Factory Authorized Service Agent if this display is shown.

10 Help 10 Display

Indicates torch trigger is depressed. Release trigger to continue.

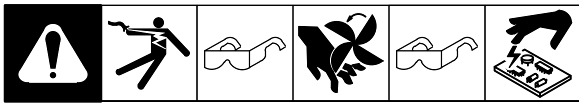
11 Help 12 Display

Indicates a non-allowable set-up on the front panel.

12 Help 13 Display

Output disable open causing weld output to stop, but gas continues to flow.

5-4. Troubleshooting



Trouble	Remedy
No weld output; unit completely inoperative.	Place line disconnect switch in On position (see Section 3-16).
	Check and replace line fuse(s), if necessary, or reset circuit breaker (see Section 3-16).
	Check for proper input power connections (see Section 3-16).
No weld output; meter display On.	If using remote control, be sure correct process is enabled to provide output control at Remote 14 receptacle (see Sections 4-1 and 3-7).
	Input voltage outside acceptable range of variation (see Section 3-15).
	Check, repair, or replace remote control.
	Unit overheated. Allow unit to cool with fan On (see Section 3-3).
Erratic or improper weld output.	Use proper size and type of weld cable (see Section 3-6).
	Clean and tighten all weld connections.
No 115 volts ac output at duplex receptacle.	Reset circuit breaker CB1 (see Section 3-5).
Fan not operating.	Check for and remove anything blocking fan movement.
	Have Factory Authorized Service Agent check fan motor.
Wandering arc	Use proper size tungsten.
	Use properly prepared tungsten.
	Reduce gas flow rate.
Tungsten electrode oxidizing and not remaining bright after conclusion of weld.	Shield weld zone from drafts.
	Increase postflow time.
	Check and tighten all gas fittings.
	Water in torch. Refer to torch manual.

Notes

SECTION 6 – ELECTRICAL DIAGRAM

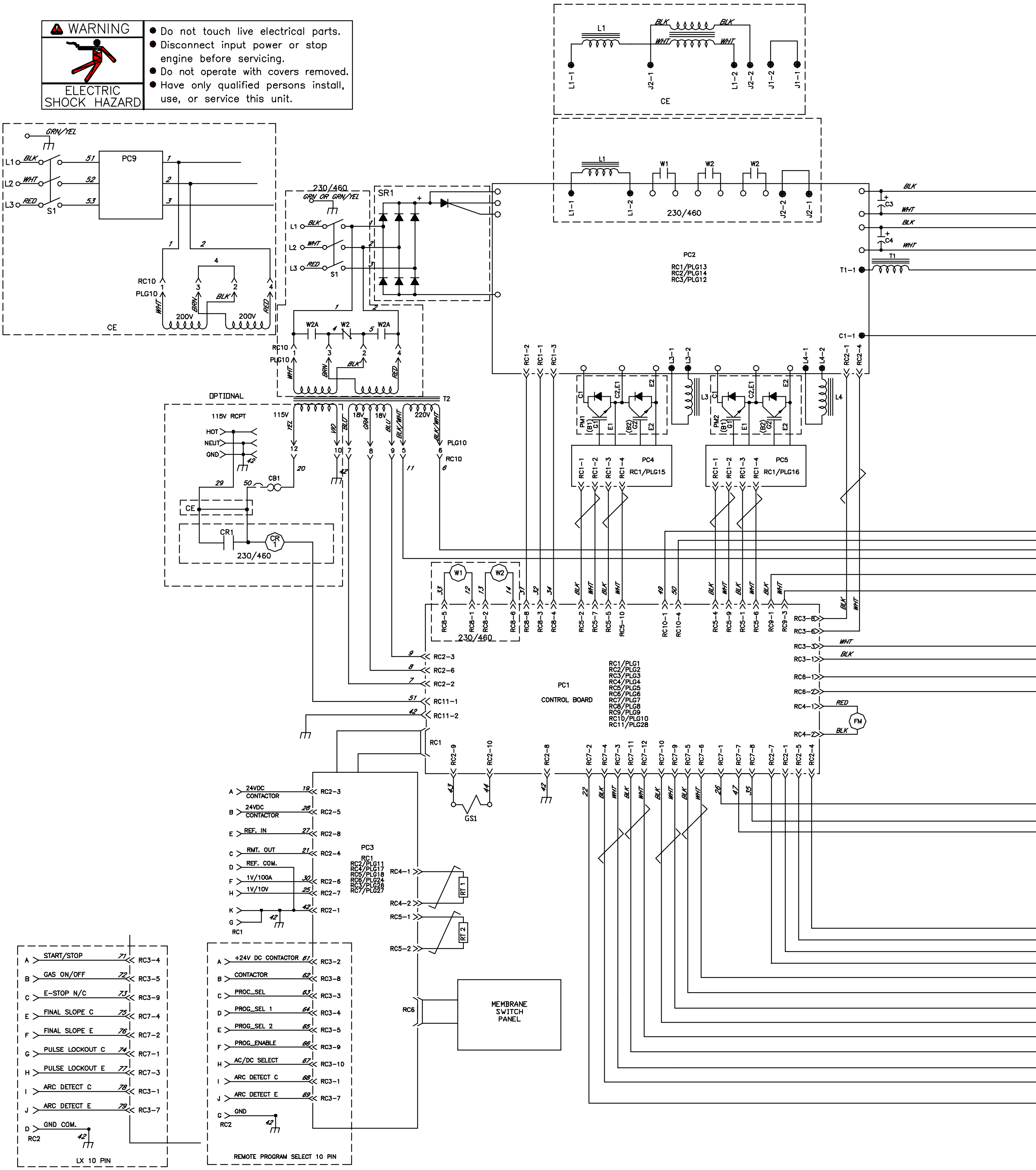
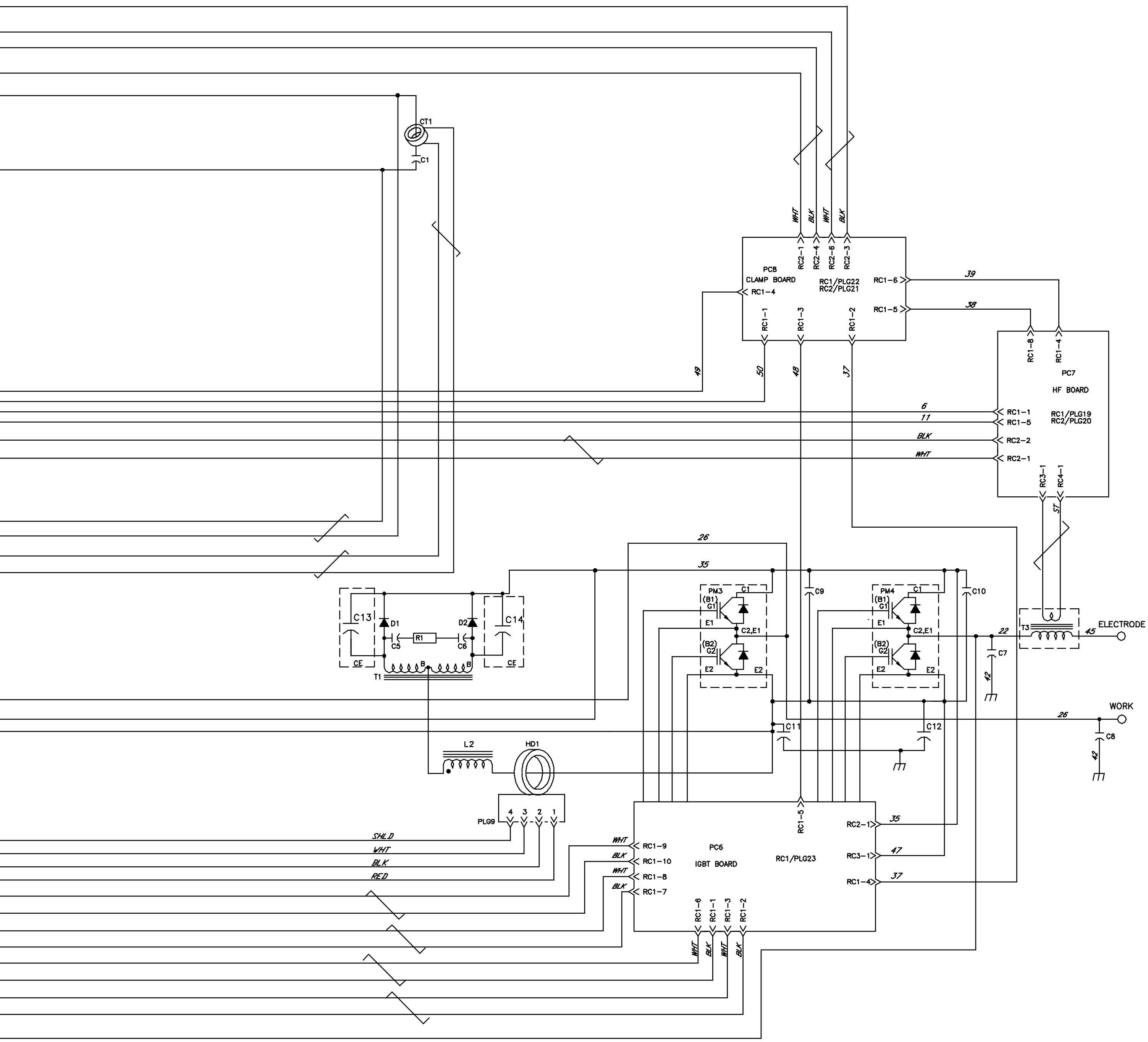


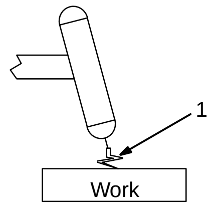
Figure 5-1. Circuit Diagram



SC-200 321

SECTION 7 – HIGH FREQUENCY

7-1. Welding Processes Requiring High Frequency



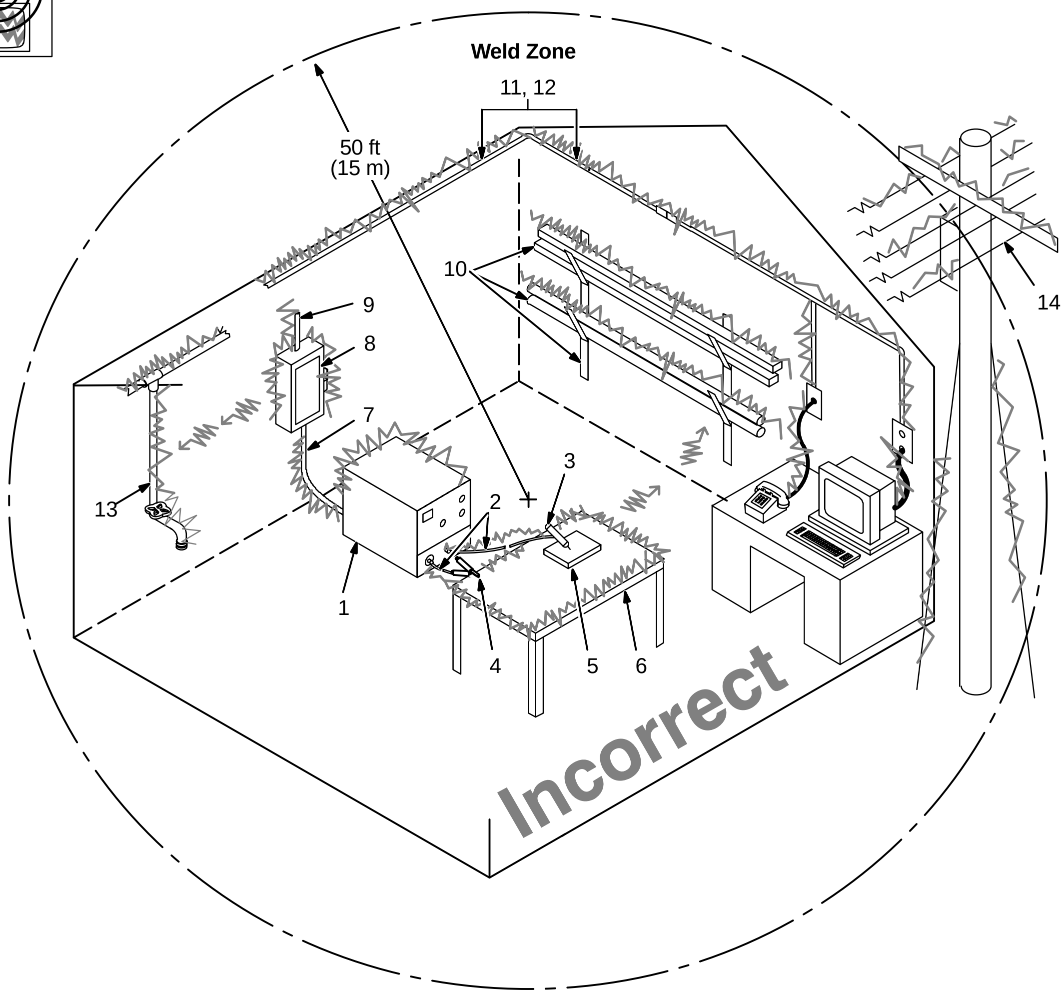
TIG

1 High-Frequency Voltage

TIG – helps arc jump air gap between torch and workpiece and/or stabilize the arc.

high_freq 12/96 – S-0693

7-2. Incorrect Installation



Sources of Direct High-Frequency Radiation

1 High-Frequency Source (welding power source with built-in HF or separate HF unit)
2 Weld Cables
3 Torch
4 Work Clamp
5 Workpiece
6 Work Table

Sources of Conduction of High Frequency

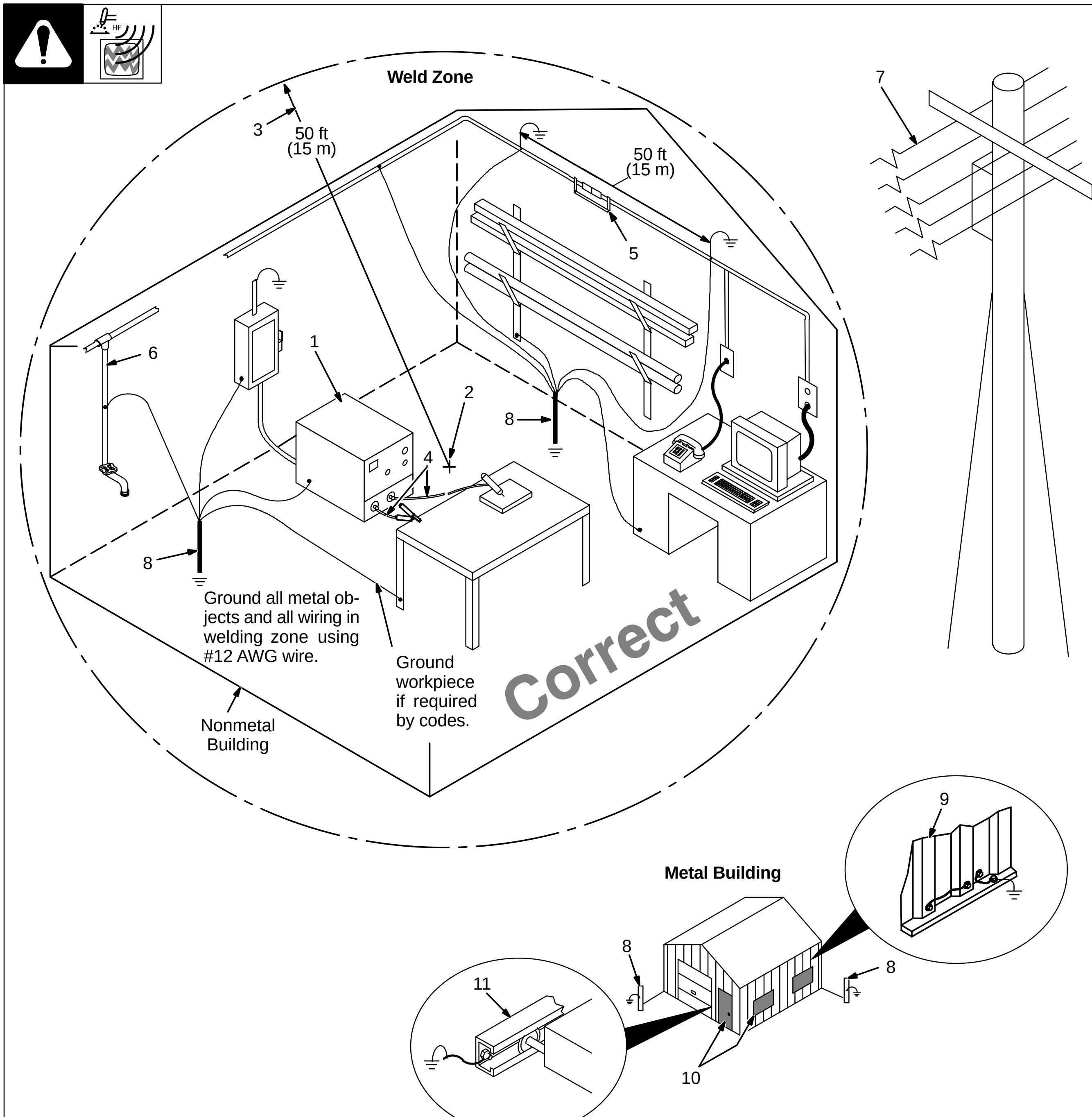
7 Input Power Cable
8 Line Disconnect Device
9 Input Supply Wiring

Sources of Reradiation of High Frequency

10 Ungrounded Metal Objects
11 Lighting
12 Wiring
13 Water Pipes and Fixtures
14 External Phone and Power Lines

S-0694

7-3. Correct Installation



Ref. S-0695 / Ref. S-0695

1 High-Frequency Source (welding power source with built-in HF or separate HF unit)

Ground metal machine case, work output terminal, line disconnect device, input supply, and worktable.

2 Center Point of Welding Zone

Midpoint between high-frequency source and welding torch.

3 Welding Zone

A circle 50 ft (15 m) from center point in all directions.

4 Weld Output Cables

Keep cables short and close together.

5 Conduit Joint Bonding and Grounding

Electrically join (bond) all conduit sections using copper straps or braided wire. Ground conduit every 50 ft (15 m).

6 Water Pipes and Fixtures

Ground water pipes every 50 ft (15 m).

7 External Power or Telephone Lines

Locate high-frequency source at least 50 ft (15 m) away from power and phone lines.

8 Grounding Rod

Consult the National Electrical Code for specifications.

Metal Building Requirements

9 Metal Building Panel Bonding Methods

Bolt or weld building panels together, install copper straps or braided wire across seams, and ground frame.

10 Windows and Doorways

Cover all windows and doorways with grounded copper screen of not more than 1/4 in (6.4 mm) mesh.

11 Overhead Door Track

Ground the track.

SECTION 8 – SELECTING AND PREPARING TUNGSTEN ELECTRODE

gtaw 7/97

NOTE ☞ *For additional information, see your distributor for a handbook on the Gas Tungsten Arc Welding (GTAW) process.Wear clean gloves to prevent contamination of tungsten electrode.*

8-1. Selecting Tungsten Electrode

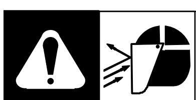
Electrode Diameter	Amperage Range - Gas Type♦ - Polarity			
	DC – Argon – Electrode Negative/Straight Polarity	**DC – Argon – Electrode Positive/Reverse Polarity**	**AC – Argon – Using High Frequency**	**AC – Argon – Balanced Wave Using High Freq.**
2% Thorium Alloyed Tungsten (Red Band)				
.010”	Up to 25	*	Up to 20	Up to 15
.020”	15-40	*	15-35	5-20
.040”	25-85	*	20-80	20-60
1/16”	50-160	10-20	50-150	60-120
3/32”	135-235	15-30	130-250	100-180
1/8”	250-400	25-40	225-360	160-250
5/32”	400-500	40-55	300-450	200-320
3/16”	500-750	55-80	400-500	290-390
1/4”	750-1000	80-125	600-800	340-525

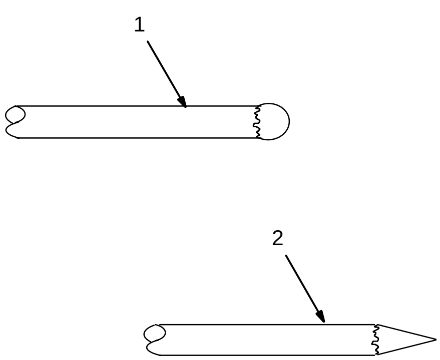
♦ Typical argon shielding gas flow rates are 15 to 35 cfh (cubic feet per hour).

*Not Recommended.

The figures listed are intended as a guide and are a composite of recommendations from American Welding Society (AWS) and electrode manufacturers.

8-2. Safety Information About Tungsten





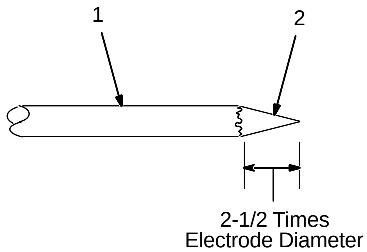
▲ **Grinding the tungsten electrode produces dust and flying sparks which can cause injury and start fires. Use local exhaust (forced ventilation) at the grinder or wear an approved respirator. Read MSDS for safety information. Consider using tungsten containing ceria, lanthana, or yttria instead of thoria. Grinding dust from thoriated electrodes contains low-level radioactive material. Properly dispose of grinder dust in an environmentally safe way. Wear proper face, hand, and body protection. Keep flammables away.**

1 Tungsten Electrode With Balled End

2 Pointed Tungsten Electrode

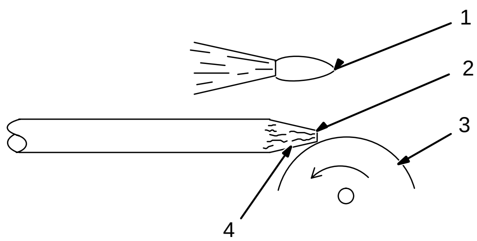
Ref. S-0161

8-3. Preparing Tungsten For AC Or DC Electrode Negative (DCEN) Welding



1 Tungsten Electrode
2 Tapered End

Grind end of tungsten on fine grit, hard abrasive wheel before welding. Do not use wheel for other jobs or tungsten can become contaminated causing lower weld quality.



Ideal Tungsten Preparation – Stable Arc

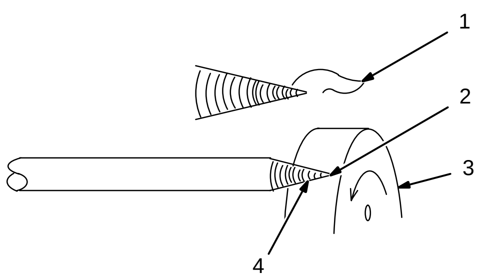
1 Stable Arc
2 Flat

Diameter of this flat determines amperage capacity.

3 Grinding Wheel

Grinding wheel should be dedicated to grinding tungsten only.

4 Straight Ground



Wrong Tungsten Preparation – Wandering Arc

1 Arc Wander
2 Point
3 Grinding Wheel

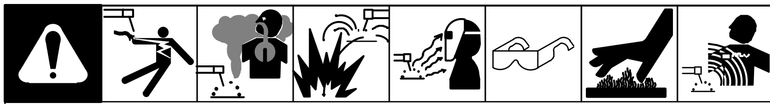
Grinding wheel should be dedicated to grinding tungsten only.

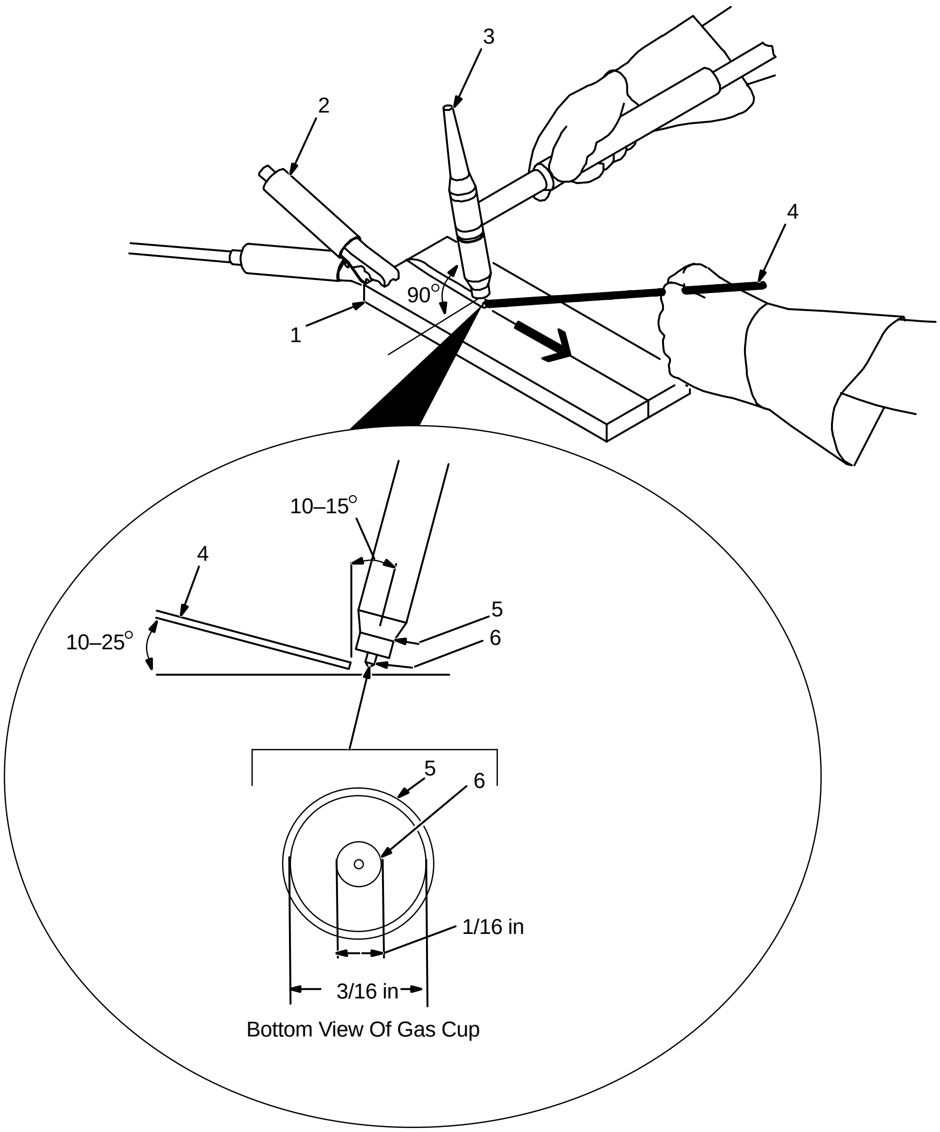
4 Radial Ground

Ref. S-0161 / Ref. S-0162

SECTION 9 – GUIDELINES FOR TIG WELDING (GTAW)

9-1. Positioning The Torch





▲ **Grinding the tungsten electrode produces dust and flying sparks which can cause injury and start fires. Use local exhaust (forced ventilation) at the grinder or wear an approved respirator. Read MSDS for safety information. Consider using cerium or lanthanum based tungsten instead of thoriated. Thorium dust contains low-level radioactive material. Properly dispose of grinder dust in an environmentally safe way. Wear proper face, hand, and body protection. Keep flammables away.**

1 Workpiece

Make sure workpiece is clean before welding.

2 Work Clamp

Place as close to the weld as possible.

3 Torch

4 Filler Rod (If Applicable)

5 Gas Cup

6 Tungsten Electrode

Select and prepare tungsten according to Sections 8-1 and 8-3.

Guidelines:

The inside diameter of the gas cup should be at least three times the tungsten diameter to provide adequate shielding gas coverage. (For example, if tungsten is 1/16 in diameter, gas cup should be a minimum of 3/16 in diameter.

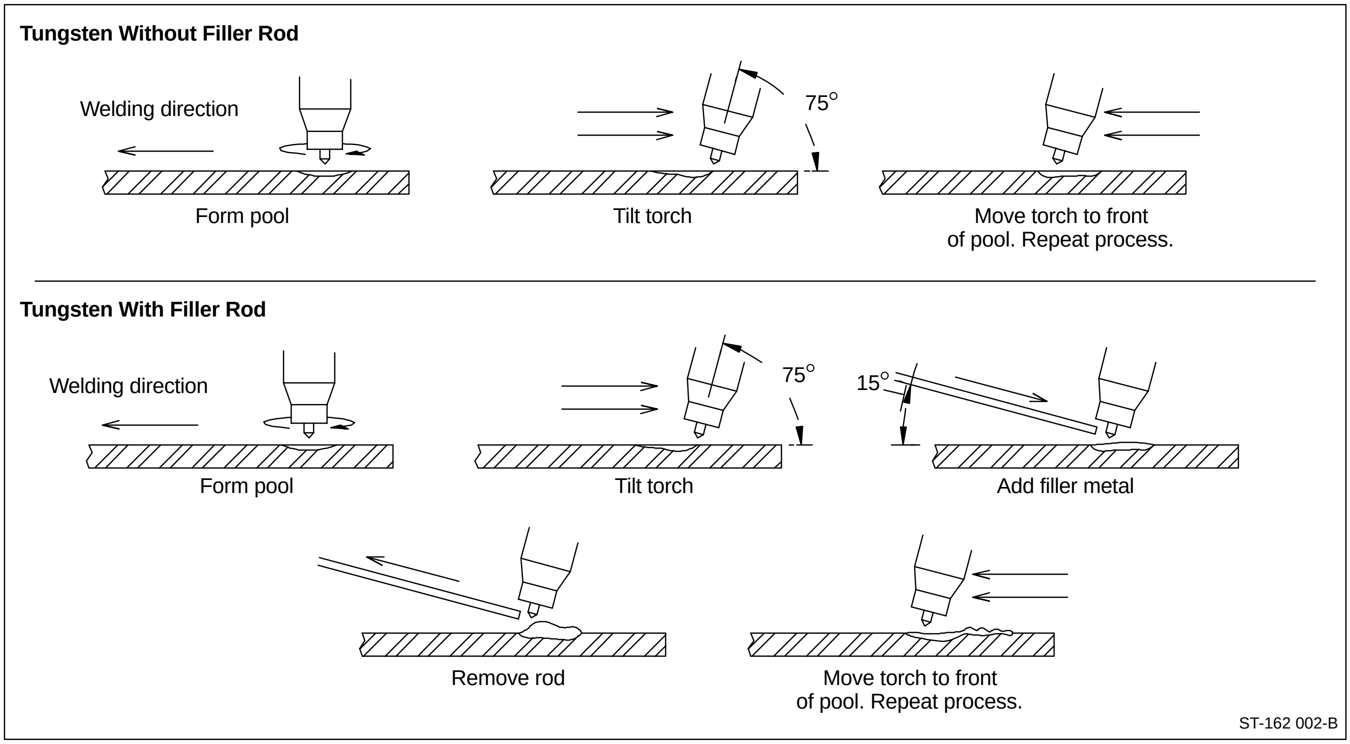
Tungsten extension is the distance the tungsten extends out gas cup of torch.

The tungsten extension should be no greater than the inside diameter of the gas cup.

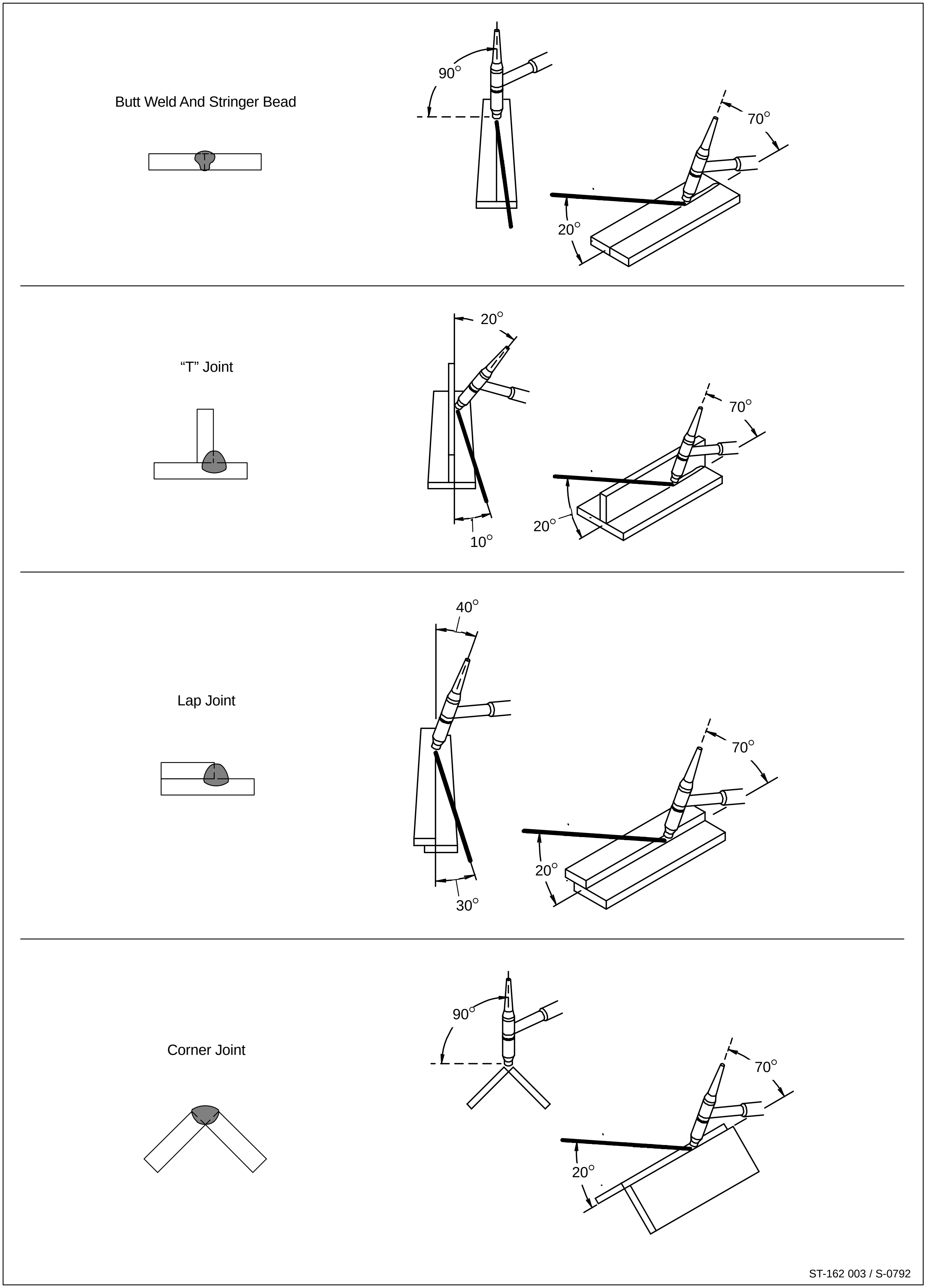
Arc length is the distance from the tungsten to the workpiece.

Ref. ST-161 892

9-2. Torch Movement During Welding



9-3. Positioning Torch Tungsten For Various Weld Joints



Notes

SECTION 10 – PARTS LIST

☞ *Hardware is common and not available unless listed.*

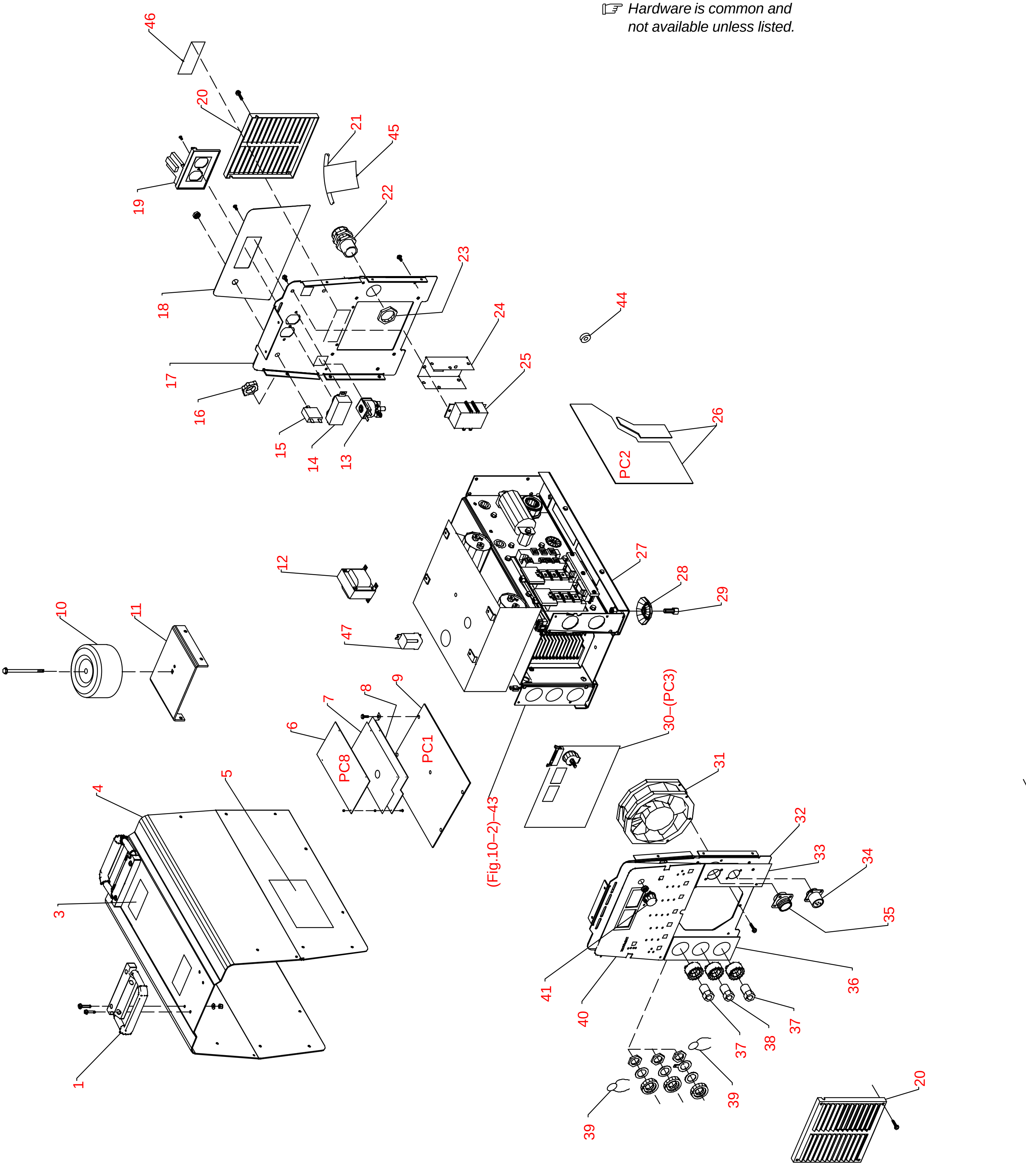


Figure 10-1. Main Assembly

ST-801 870-J

Item No.	Dia. Mkgs.	Part No.	Description	Quantity Model 230/460	Quantity Model 400 CE

Figure 10-1. Main Assembly

Item No.	Dia. Mkgs.	Part No.	Description	230/460	400 CE
1		195 585	HANDLE, rubberized carrying	2	2
3		138 442	LABEL, caution falling	2	
3		179 309	LABEL, caution falling		2
4		+175 148	WRAPPER	1	1
		175 256	INSULATOR, side RH & LH	2	2
5		134 327	LABEL, warning general precautionary	2	
5		179 310	LABEL, warning general precautionary		2
6	PC8	197 988	CIRCUIT CARD ASSEMBLY, clamp	1	1
	PLG21	115 094	CONNECTOR & SOCKETS	1	1
	PLG22	115 093	CONNECTOR & SOCKETS	1	1
7		183 613	INSULATOR, PC card clamp	1	1
8		182 498	BRACKET, mtg PC card clamp		1
9	PC1	201 285	CIRCUIT CARD ASSEMBLY, control	1	
9	PC1	201 282	CIRCUIT CARD ASSEMBLY, control		1
	PLG2	115 091	CONNECTOR & SOCKETS	1	1
	PLG3	115 092	CONNECTOR & SOCKETS	1	1
	PLG4	131 054	CONNECTOR & SOCKETS	1	1
	PLG5	115 091	CONNECTOR & SOCKETS	1	1
	PLG7	130 203	CONNECTOR & SOCKETS	1	1
	PLG8	115 092	CONNECTOR & SOCKETS	1	1
	PLG9	131 204	CONNECTOR & SOCKETS	1	1
	PLG10	115 094	CONNECTOR & SOCKETS	1	1
10	T2	♦193 311	TRANSFORMER, control		1
10	T2	♦193 310	TRANSFORMER, control	1	
11		♦187 461	BRACKET, mtg aux transformer		1
12	T2	189 536	TRANSFORMER, control	1	
12	T2	180 873	TRANSFORMER, control		1
	RC10	166 679	CONNECTOR & SOCKETS	1	1
	PLG10	166 680	CONNECTOR & PINS	1	1
13	GS1	133 873	VALVE, 24VDC 2way	1	1
14		♦189 033	RECEPTACLE, str dx grd 2P 3W 15A	1	1
15	CB1	♦083 432	CIRCUIT BREAKER, 1P 10A 250VAC	1	
15	CB1	♦161 078	CIRCUIT BREAKER, 1P 7A 250VAC		1
16		605 227	NUT, .750-14 knurled	1	1
17		182 205	PANEL, rear	1	1
18			PLATE, identification rear (order by model and serial number)	1	1
19		♦175 282	COVER, receptacle	1	1
20		175 138	BOX, louver	2	2
21		182 561	CABLE, pwr	1	1
22		175 213	BUSHING, strain relief .472/.787 ID	1	1
23		182 445	NUT, stl locking	1	1
24		176 226	INSULATOR, switch power	1	1
25	S1	128 756	SWITCH, tgl 3PST 40A 600VAC (Power Switch)	1	1
26	PC2	185 090	CIRCUIT CARD, assembly	1	1
		176 879	SCREW, M5–.8–2	18	18
	PLG13	131 204	CONNECTOR & SOCKETS	1	1
	PLG14	115 094	CONNECTOR & SOCKETS	1	1
		179 626	BUS BAR, interconnecting	1	1
27		+175 132	BASE	1	1
28		173 693	FOOT, mtg unit	4	4
29		176 736	SCREW, mtg foot	4	4
30	PC3	200 339	CIRCUIT CARD, front panel (DX and SD models) (consisting of)	1	1
30	PC3	200 340	CIRCUIT CARD, front panel (LX models) (consisting of)	1	1
	DD1-6	186 914	LED	6	6
	PLG17, 18	131 054	CONNECTOR & SOCKETS	1	1

Item No.	Dia. Mkgs.	Part No.	Description	Quantity Model 230/460	400 CE

Figure 10-1. Main Assembly (Continued)

Item No.	Dia. Mkgs.	Part No.	Description	230/460	400 CE
	PLG26	115 091	CONNECTOR & SOCKETS	1	1
	PLG11	115 092	RECEPTACLE, w/leads & plug	1	1
31	FM	175 084	MOTOR, fan 24VDC 3000RPM	1	1
		135 635	CONNECTOR & SOCKETS	1	1
32		200 320	PANEL, front	1	1
33		191 173	NAMEPLATE, RH	1	1
33		191 172	NAMEPLATE, RH W/Optional 10-pin Installed (LX models)	1	1
34	RC2	♦191 302	CONNECTOR & SOCKETS	1	1
34	RC2	♦197 181	CONNECTOR & SOCKETS (LX models)	1	1
35	RC1	188 186	CONNECTOR & SOCKETS	1	1
36		192 018	NAMEPLATE, LH	1	1
37		185 703	RECEPTACLE, twist lock assembly	2	2
38		187 235	RECEPTACLE, female gas	1	
38		188 192	RECEPTACLE, male gas		1
39	C7,8	186 543	CAPACITOR ASSEMBLY	2	2
40		198 707	MEMBRANE PANEL (DX, LX models)	1	
40		198 710	MEMBRANE PANEL (SD models)	1	
40		198 713	MEMBRANE PANEL (DX, LX, CE models)		1
40		198 715	MEMBRANE PANEL (SD CE models)		1
41		174 991	KNOB, encoder	1	1
43		Fig 10-2	WINDTUNNELS w/COMPONENTS	1	1
44		182 108	CHOKE		1
45		182 826	LABEL, warning electric shock power cord	1	
46		148 329	LABEL, caution incorrect voltage	1	
47		♦059 266	RELAY, encl 120 VAC DPDT 10A/120VAC 8-Pin Flange Mtg	1	

+When ordering a component originally displaying a precautionary label, the label should also be ordered.
♦Optional
To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.

☞ *Hardware is common and not available unless listed.*

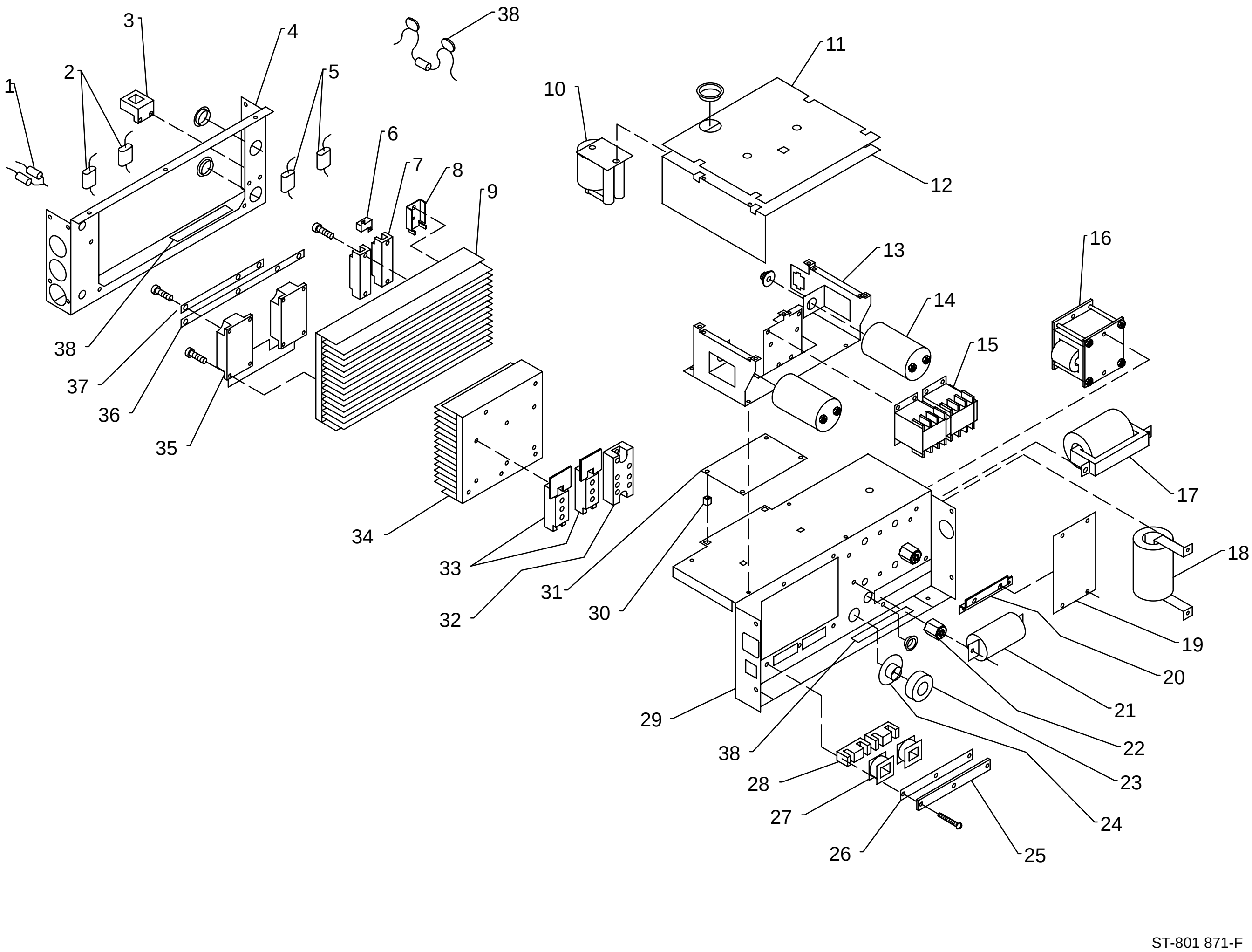


Figure 10-2. Windtunnels w/Components

Item No.	Dia. Mkgs.	Part No.	Description	Quantity Model 230/460	Quantity Model 400 CE
			Figure 10-2. Windtunnels w/Components (Fig 10-1 Item 43)		
1	C11,12	185 424	CAPACITOR, filter assembly	1	1
2	C9,10	201 391	CAPACITOR, polyp met film 1uf 600VDC	2	2
3	HD1	182 918	TRANSDUCER, current 400A	1	1
4		+182 206	WINDTUNNEL, LH	1	1
5		185 424	CAPACITOR, filter assembly		2
6	R1,C5,6	175 194	RESISTOR/CAPACITOR	1	1
7	D1,2	185 775	KIT, diode	1	1
8		188 361	HEAT SINK	2	2
9		182 208	HEAT SINK	1	1
10	T3	182 667	TRANSFORMER, coupling	1	1
11		183 073	INSULATOR, PC card HF	1	1
12		182 499	ENCLOSURE, HF	1	1
13		182 806	BRACKET, mtg contactor/capacitor/PC board	1	1
14	C3,4	174 980	CAPACITOR, elctlt 2700uf 420VDC	2	2
15	W1,2,2A	175 082	CONTACTOR, def prp 40A 7P	1	

Item No.	Dia. Mkgs.	Part No.	Description	Quantity Model 230/460	400 CE
			Figure 10-2. Windtunnels w/Components (Fig 10-1 Item 43) (Continued)		
		173 763	STAND-OFF, No. 10-32 x 1.418 lg	7	
16	T1	183 014	TRANSFORMER, HF	1	1
17	L2	183 009	STABILIZER, output	1	1
18	L1	187 522	INDUCTOR, input	1	1
19	PC9	187 264	CIRCUIT CARD ASSEMBLY, input filter		1
20		187 463	BRACKET		1
21	C1	186 549	CAPACITOR, polyp .27uf 1000VDC	1	1
22		025 248	STAND-OFF, insul .250-20 x 1.250 lg	2	2
23	CT1	175 199	TRANSFORMER, current	1	1
24		177 547	BUSHING, snap-in CT-mount	1	1
25		175 140	BRACKET, DI-DT	1	1
26		181 197	GASKET, DI-DT rubber	1	1
27	L3,4	175 482	COIL, DI-DT	2	2
28		109 056	CORE	2	2
29		+187 460	WINDTUNNEL, RH	1	1
30		141 690	GROMMET, scr No. 8/10	4	4
31	PC7	189 135	CIRCUIT CARD, HF (consisting of)	1	1
	F1	012 633	FUSE, mintr gl 1A 250V	1	1
		188 109	POINT, spark gap	2	2
	PLG19	115 092	CONNECTOR & SOCKETS	1	1
	PLG20	131 054	CONNECTOR & SOCKETS	1	1
32	SR1	179 629	KIT, diode	1	1
33	PM1,2/PC4,5	179 628	KIT, transistor IGBT module	1	1
	RT1,2	173 632	THERMISTOR, NTC 30K ohm	2	2
34		173 631	HEAT SINK, power module	1	1
35	PM3,4/PC6	185 776	KIT, IGBT	1	1
	PLG23	115 091	CONNECTOR & SOCKETS	1	1
36		182 641	BUS BAR, diode IGBT	1	1
37		182 642	BUS BAR, IGBT	1	1
38		185 835	LABEL, warning exploding parts	2	
38		185 836	LABEL, warning exploding parts		2

+When ordering a component originally displaying a precautionary label, the label should also be ordered.

To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.

TRUE BLUE® WARRANTY

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Within the warranty periods listed below, Miller will repair or replace any warranted parts or components that fail due to such defects in material or workmanship. Miller must be notified in writing within thirty (30) days of such defect or failure, at which time Miller will provide instructions on the warranty claim procedures to be followed.

Miller shall honor warranty claims on warranted equipment listed below in the event of such a failure within the warranty time periods. All warranty time periods start on the date that the equipment was delivered to the original retail purchaser, or one year after the equipment is sent to a North American distributor or eighteen months after the equipment is sent to an International distributor.

1. 5 Years Parts – 3 Years Labor
   * Original main power rectifiers
   * Inverters (input and output rectifiers only)
2. 3 Years — Parts and Labor
   * Transformer/Rectifier Power Sources
   * Plasma Arc Cutting Power Sources
   * Semi-Automatic and Automatic Wire Feeders
   * Inverter Power Supplies
   * Intellitig
   * Engine Driven Welding Generators
     (NOTE: Engines are warranted separately by the engine manufacturer.)
3. 1 Year — Parts and Labor
   * DS-2 Wire Feeder
   * Motor Driven Guns (w/exception of Spoolmate 185 & Spoolmate 250)
   * Process Controllers
   * Positioners and Controllers
   * Automatic Motion Devices
   * RFCS Foot Controls
   * Induction Heating Power Sources
   * Water Coolant Systems
   * HF Units
   * Grids
   * Maxstar 140
   * Spot Welders
   * Load Banks
   * Miller Cyclomatic Equipment
   * Running Gear/Trailers
   * Plasma Cutting Torches (except APT & SAF Models)
   * Field Options
     (NOTE: Field options are covered under True Blue® for the remaining warranty period of the product they are installed in, or for a minimum of one year — whichever is greater.)
4. 6 Months — Batteries
5. 90 Days — Parts
   * MIG Guns/TIG Torches
   * Induction Heating Coils and Blankets
   * APT, ZIPCUT & PLAZCUT Model Plasma Cutting Torches
   * Remote Controls
   * Accessory Kits
   * Replacement Parts (No labor)
   * Spoolmate 185 & Spoolmate 250
   * Canvas Covers

Miller's True Blue® Limited Warranty shall not apply to:

1. **Consumable components; such as contact tips, cutting nozzles, contactors, brushes, slip rings, relays or parts that fail due to normal wear.**
2. Items furnished by Miller, but manufactured by others, such as engines or trade accessories. These items are covered by the manufacturer's warranty, if any.
3. Equipment that has been modified by any party other than Miller, or equipment that has been improperly installed, improperly operated or misused based upon industry standards, or equipment which has not had reasonable and necessary maintenance, or equipment which has been used for operation outside of the specifications for the equipment.

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